RAVALLI NATIONAL WILDLIFE REFUGE

Stevensville, Montana

NARRATIVE REPORT

1970

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

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Personnel

Howard A. Lipke	Refuge Manager
Ellen H. Anderson	Clerk-Stenographer
Thomas B. Davies	Maintenanceman Leader
Otto Wolf	Maintenanceman W.A.E.
Roy W. Williamson	Laborer, Intermittent

U. S. Department of the Interior

Fish and Wildlife Service

Bureau of Sport Fisheries and Wildlife

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1970

I. GENERAL

A. Weather Conditions

The winter of 1969-70 was another good snow year with January the wettest recorded in many years. The 2.30 inches of precipitation for the month was almost double the normal amount and was the largest monthly total for the year. The coldest 1970 temperatures occurred during the first of January (low of -10) and the largest snow storm dropped about a foot of snow on the valley floor during a three day period (January 16-18).

February was generally warm and dry with only .20 inches of precipitation falling. Periodic cold and warm weather prevailed after a snow storm dropped six inches on the last day of February.

March could be described as wet and windy. After temperatures around the 70 degree mark during the first of April, unseasonably cool weather persisted throughout the remainder of the spring period.

Lack of early thawing and a frontal system that dropped 13 inches of snow in the Sapphire Mountains on May 10-11 compounded the threat of flooding to the valley. However, alternating cool and hot periods through June prevented the Bitterroot River from causing serious damage.

Hot June and early July weather was replaced by cooler weather and substantial late July rains. Precipitation during the two months amounted to almost four inches, 1.24 inches above normal, with July one of the wettest in many years.

Hot days and cool nights persisted throughout August and only .05 inch of moisture was reported. The month was the seventh driest in 85 years at Missoula, which also reported 14 days of 90 degrees or above. Cooler weather and rain started early in September with five consecutive nights of killing frost reported beginning the 10th.

Cold but normal temperatures were in effect for the last three months of the year with precipitation well below normal for the same period. The first valley snow was reported on October 26th, followed by periodic light snow activity until the end of the year. Freezing temperatures which dropped as low as -2 and 0 degrees in November and December resulted in periodic pool freezing from mid November on.

Total precipitation of 12.28 inches for the year was .43 inch below normal, with seven months reporting below average amounts. Above normal January and July moisture contributed 2.30 inches and 2.10 inches, respectively, to the total. The low temperature during 1970 was -10 degrees in January and the highest, a 96 degree reading in July.

1970 Weather Data - Stevensville Station

Temperatures				Precip.	
Month	High	Low	Ave.	Totals	Remarks (Ppt.)
Jan.	49	-10	25.7	2.30	1.23" above normal
Feb.	58	16	34.5	.20	-.80" below normal
March	57	6	34.6	1.09	.26" above normal
April	72	15	40.2	.38	-.40" below normal
May	83	25	53.0	1.21	-.31"below normal
June	94	33	62.6	2.10	.37" above normal
July	96	38	66.6	1.80	.87" above normal
Aug.	94	36	64.7	.05	-.64" below normal
Sept.	84	20	50.7	1.06	.14" above normal
Oct.	81	14	41.4	.47	-.47" below normal
Nov.	58	- 2	33.9	.88	-.22" below normal
Dec.	50	0	25.0	.74	-.46" below normal

B. Habitat Conditions

1. Water

Variable runoff and precipitation had very little adverse affect on the maintenance of pool levels and irrigation of grasslands and croplands in 1970. Some minor impoundments and agricultural land on the west side of the refuge adjacent to the Bitterroot River were influenced by high river levels during the June peak runoff.

Major refuge pools were not subject to fluctuations due to runoff from the spring thaw or summer rains. The supply to these impoundments and irrigated agricultural land comes from numerous, generally consistent sources, and therefore, pool levels remain relatively stable.

The winter of 1969-70 was another good snow year with January the wettest since 1913 and 13 inches falling in the Sapphire Mountains in a May storm. The heavy accumulations combined with cold temperatures

in April and May posed a serious flood threat, but alternating cold and warm periods in late May and June prevented extensive flooding and damage in the Bitterroot Valley.

The Bitterroot River rose early in May, again in mid May out of its banks, and after a cold spell peaked during the first week of June. The Bass Creek control which is a fairly accurate gauge of the river level peaked at 3251.20 on June 6th. By the end of the third week the flood threat was over; however, severe erosion had cut into one section of refuge riverbank 106 feet.

Winter carryover of water was good on all major pools except 1, with ample scattered open water present for wintering ducks. Periodic warm spells further opened refuge pools and on February 21 about 60 percent of the 550 marshland acres was open. Freezing and thawing occurred until the last major ice was gone by March 16th.

Supply Ditch irrigation water was flowing by the first of May and most of the eight major and 14 minor impoundments were at near approved elevations by mid May. Filling of Pool 1 was delayed until mid June.

Water levels on the eight major impoundments remained relatively stable throughout the rest of the summer with major manipulation of levels on 8 and 10. Frequent rains made July the wettest in many years and greatly reduced irrigation water needs. The following month was the seventh driest in 85 years and refuge pools showed slight decreases in levels.

The Bitterroot River reached its lowest level in late August resulting in decreased flow to the Bass Creek/McPherson diversion system. Available water was diverted to grassland irrigation in tract 12 resulting in decreased water levels in small impoundments along the system.

Three Mile Creek water was not monitored or regulated again this year pending development in tract 27. Heavy spring runoff lasted through the first week of June and water flow was substantial throughout the remainder of the year. Refuge use of this water was limited to maintenance of two 10 acre ponds in tract 27 but development of a 50-55 acre marsh in 1970 (Pool 12) will require diversion and increased water use from this system.

Refuge cropland irrigation was terminated the first of August and grassland irrigation about the first of September. Water from the Supply Ditch flowed until the first of November (reduced volumes in October). Most major pools showed gradual decreases beginning in September and with some manipulated to increase waterfowl utilization.

After several periods of freezing and thawing which began in November, refuge pools were 95 percent ice covered by the end of the second week of December.

2. Food and Cover

Food and cover conditions were generally good throughout the year. Cover produced during a good 1969 growing season plus the relatively open winter of 1969-70 resulted in very little strain on resident wildlife and wintering waterfowl.

White-tailed deer may have experienced some shortage of cover and/or browse as evidenced by their seasonal movement northeastward off the refuge. However, February weather was mild and open with some movement of deer back onto the area, and waterfowl completing their use of the 43 acres (estimated 3480 bu.) of standing grain in refuge fields. Grain was largely utilized by the time of spring breakup with limited waste grain available to birds during the spring migration period.

Due to unseasonably cool weather grass growth was delayed during the spring, but residual vegetation from the previous year provided good cover for nesting birds. Timber and brush cover was also good providing ample habitat for woodland wildlife species.

A 35 acre controlled burn in tract 27 in early May resulted in considerable resprouting of browse plants and also improved grass/forb communities. Available browse was thought to be at least tripled with dogwood, black cottonwood, and one species of willow heavily utilized by deer throughout the remainder of the year. The improved food and cover conditions were largely responsible for the substantially increased deer and ruffed grouse use of the area.

The advent of hot weather during the first of June resulted in increased grass vigor and improved cover for late nesting wildlife species. Heavy July rains also favored vegetative growth and 1970 turned out to be one of the best for cover conditions and crops in many years.

Upland brood cover was excellent in 1970 but some deficiencies were again noted for waterfowl brood cover. Distribution and extent of emergent cover in Pools 1 through 5 was considerably lacking, being limited mainly to the southern portions of the units. Pool 6 had excellent interspersion of cattail, open water, and aquatics as reflected by the highest density of duck brood use of any unit on the refuge.

Pool 8 and 10 emergents improved considerably over last year but flooded brush and timber was still needed to provide supplemental protective cover. Manipulation of water levels and transplanting of bulrush on most pools hopefully will improve needed brood cover in the future.

Production of submerged aquatics was excellent again in 1970 with all major pools contributing to the total volume of foods produced. The open water areas of pools 2, 3 and 6 were about 90 percent covered with aquatic growth in July. Pools 5, 8 and 10 also produced large volumes of food.

Submerged aquatic plant growth was supplemented by the production of moist soil foods in most smaller, minor impoundments and in Pool 10. Pool 10 levels were increased in late fall and waterfowl use was good along flooded marsh margins.

Sharecropping on 296 acres of refuge agricultural land added to the diversity of available wildlife food. Crop yields from wheat and barley were down from a year ago but 3,650 bushels from the 53.5 acres of standing grain will meet wintering waterfowl and upland game needs. Grain utilization began in late November, about three weeks earlier than in 1969.

A total of 63 acres of 1969 fall planted wheat was available to browsing geese during the spring, and 67 acres were planted in the fall of 1970. Fall utilization of wheat browse was limited but use was significant during the spring, and during thawing spells within the winter period.

Refuge agricultural crops were supplemented by private farm fields, principally to the east of the refuge. However, major off-refuge feeding flights did not materialize as they did in 1969.

Food and cover conditions at the end of the reporting year were very good with excellent residual grass cover, and the majority of the grain crop still available for wintering waterfowl. Upland habitat conditions are also good with a substantial improvement of browse conditions in the tract 27 area.

II. WILDLIFE

A. Migratory Birds

Ducks

Duck use resulted in a total of 1,243,620 use-days in 1970. The figure was the second highest in the six year history of the refuge and represented a 12 percent increase over last year's figure. The increase of over 132 thousand use-days was the result of increases in both spring and fall period use. It was the fourth straight year that total use exceeded one million use-days.

During the first two and one-half months of the year the wintering duck population never dropped to the reported high of 3,000 during the same period in 1969. Duck numbers did not fall below 4,500 and the peak of 11,505 during the first week of February established a new record for the refuge. The figure was 8 percent higher than the previous high of 10,650 established during the fall period in 1968.

Over 576 thousand spring use-days compared closely to the record 1968 spring use and represented a 32 percent increase over last year. Mallard use contributed 79.6% of the total, and the peak number of 11,370 was more than double that of any previous year. Pintail use showed a substantial increase largely due to the peak of 4,500 reported in late March. Redheads and canvasbacks, represented by smaller numbers, showed very significant decreases during the year, most notably during the spring period.

Mid March weather and the opening of refuge pools signaled changes in feeding activity with about 3,000 mallards using the last of refuge grain in tract 10. Duck numbers dwindled quickly after a late March peak of about 8,000, and by the end of May the breeding population was stabilized with the exception of minor diver movements.

A total of 316 breeding pairs of ducks were present in the refuge duck population of under 800. An additional 24 pairs of mergansers were present. Mallards, cinnamon and blue-winged teal were nearly equally represented and together accounted for 52.4 percent of the total pairs. Redheads and ruddy ducks were the most common diver species, together accounting for 17.9 percent of the total.

Production from the 340 pairs was 1,170, only a slight increase over last year's total of 1,100. Production was 66 percent of the record number 1,780 raised in 1968. Percentages of the total production for the principal species was as follows: mallard--22.7%, cinnamon teal -18.5%, blue-winged teal--15.6%, wood duck--10.0%, hooded merganser -7.7%, ruddy duck--7.0%, and redhead--6.4%.

The summer duck population made good use of most refuge pools with particularly heavy brood and late summer use made of units 6, 8, and 10. Total summer use-days was the lowest reported in four years and the 180,229 was only 55.2 percent of last year's record number. Nearly 100 thousand fewer use-days were reported for mallards alone. Duck and merganser numbers never exceeded 2,216 throughout the summer period.

Aside from a temporary increase in the duck population during the month of October, fall numbers remained relatively low until a significant buildup occurred beginning the fourth week of November. The October increases were largely the result of increased widgeon and diver use. A total of 1,850 ruddy ducks were censused during the first week, followed two weeks later by almost 2,100 widgeon (50 percent of the total refuge population).

The fall peak of 7,560 was reached by the first of December, representing a 65.2 percent increase over last year's figure but still far below the record fall peak set in 1968 (10,650). The 487,340 fall use-days recorded were 39.9 percent above last year's total and 9.0 percent below the record number established in 1968.

During the fall period mallard use made up 69.9 percent of the total duck use, followed by 16.4 percent widgeon use in which the 80,115 use-days represented a 86 percent increase over the previous high set in 1968. Peak numbers for the two species were 7,100 and 2,095, respectively.

Other species were represented in smaller less significant numbers. Redhead use continued its substantial two-year downward trend, with many other species showing no change or insignificant decreases. Significant increases were reported for gadwall, pintail, and green-winged teal, and a 429 increase occurred in ruddy duck use-days over last year.

Mallards, widgeon and pintails accounted for 81.9 percent of the annual use-day figure of 1,243,620. Mallard increases during the spring and fall periods offset the substantial decrease during the summer, and use by that species represented 66.2 percent of the total. Widgeon and pintail contributed 9.9 percent and 5.8 percent, respectively.

Geese

Canada goose use increased in two of the three reporting periods and a record 33,124 use-days were reported for the year. This represents a 21 percent increase over the previous high of 27,363 in 1969.

Goose numbers during the wintering period varied considerably, between as few as 20 during the month of January and a high of 230 during the second week of February. Weather fluctuations were responsible for weekly and sometimes daily changes in the population. The 8,582 spring use-days represents a record number for that period. By the first of March the refuge population was relatively stabilized with limited interchange between the river and refuge.

Eight breeding pairs of geese had established territories early in the spring and total refuge production was closely calculated at 27 young. This represents a decrease from the 50 reported in 1969; however, some of last year's figure was thought to occur from broods from off-refuge nesting attempts.

A total of six nests were located, five of which were aerial nesting attempts. In the five closely checked initial nesting attempts the average clutch size was 5.6 and 92.8 percent of the eggs hatched. Brood survival was 100 percent with one brood actually gaining one gosling, apparently from an off-refuge nest.

Movements of adult geese coming out of the molt resulted in a temporary increase in refuge numbers in mid July, but after the first of August no goose-use was noted until September 3, the first significant use not occurring until the 15th. This annual movement occurred about one month earlier than a year ago. Total use-days for the summer period was down over two thousand from the record 7,770 established last year.

Fall numbers of Canada geese remained relatively low until mid October and November increases brought the population up to a new record fall peak of 355 in early December. Gradual decreases occurred from that time until the end of the year. The fall peak occurred about four weeks earlier than last year and represented a 26.8 percent increase over the previous high of 280 in 1969. The nearly 19 thousand use-days represented a 51.6 percent increase over last year's fall figure.

Refuge goose use was greatly influenced by weather and other off-refuge pressures; however, it is apparent that annual use will continue to increase due to increased local production and attractiveness of the area. Goose management objectives have been updated to include 55,000 goose use-days (all species).

White-fronted, snow, and Ross' geese all made an appearance on the refuge in 1970. A single white-front made its appearance early in May and scattered visits by Ross' geese accounted for a total of 49 use-days by both species.

The only significant use by other species was by snow geese. The peak of 400 in early April was double the previous high from 1965; however, the 4,781 use-days was only slightly higher than the figure for that same year. In 1969 a peak of 115 used the refuge and use-days totaled only 1,925.

No fall use was reported for snow geese; however, a major migration occurred over the valley on November 6. The migration, likely containing some Ross' geese, was first noted in the early evening and lasted for at least six hours.

Swans

Whistling swan use increased substantially in 1970, due mainly to a new refuge peak of 200 and the most prolonged spring use in the refuge's six-year history. Peak swan activity was about one month earlier than last year with the peak number reported during the first week of March. A total of 3,623 use-days were recorded for the year, up from last year's record number of 2,030.

Spring use accounted for 3,483 (96 percent) of the total use-days, almost double the use for the same period last year.

The last major activity by swans was reported in late May when a group of seven was observed. Throughout the summer and fall periods a single swan was present in 22 of the 35 weekly reporting periods. The young bird was thought to be a crippled or diseased bird that could not make the northward journey.

Fall use was the lowest since 1965 when no swan use was reported for the refuge. Reduced fall use eliminated the chance of losses to hunters, although it is thought that the single bird present late in the year did fall prey to a "hunter's" gun. Five were shot during the 1969 hunting season.

Coots

A decrease of almost two hundred thousand use-days during the summer period resulted in a 47.4 percent decrease in total coot use-days in 1970. A total of 204,820 were reported for the year, and in spite of decreased use from the past two years, a new refuge peak of 3,150 was established.

Total spring and fall use showed no significant variation from the previous two years. However, only 59,710 summer use-days occurred compared to 248,500 reported during the same period last year. Production from 84 breeding pairs was estimated at 420 young, up slightly from the 400 raised in 1969.

The coot population gradually increased from resident numbers until the refuge peak was reached during the third week of October. Numbers decreased drastically in the next two weeks, and by mid November coot use was insignificant.

Water and Marsh Birds

Great blue herons were again the most common of the water birds using the refuge. Use was reported throughout the year with peak activity occurring during the last half of August when 40-50 were present. Pools 8 and 10 and smaller oxbow impoundments were the principal use areas.

Bitterns made one of their infrequent visits to the refuge this spring. One was observed as early as May 16 and last heard on the 2nd of June.

Although not observed on the refuge, sandhill cranes migrated through the valley this year. A pair was heard west of the refuge this spring and a Dr. Bell observed a pair in the vicinity of Hamilton. During the fall a single young crane was observed on several occasions feeding in a field less than a half mile east of the refuge.

Five species of grebes frequented the refuge in 1970 (see NR-1A's). Horned and red-necked grebes were spring visitors with pied-billed grebes the only significant summer resident. Western grebes were present during a two week period beginning the 9th of October, and all species except red-necked were represented during the fall migration.

A single loon was present between April 28 and May 1, about one week later than use by another single bird in 1969.

Shorebirds, Gulls and Terns

A list of the species noted on the refuge, and details of observations are reported on NR-1A's.

Late April marked the arrival of most of the shorebirds with the remainder arriving during the first half of May. Of the more consistent refuge users, killdeer were present periodically throughout the winter with Wilson's snipe activity picking up during the first of April. Species not recorded during the 1969 migration included willet, avocet, and marbled godwit. One of the more abundant spring migrants, Wilson's phalarope, arrived in early May, about two weeks later than last year.

Killdeer, Wilson's snipe, and sora rail were the principal summer residents with some production occurring for each of the species. Late September was the peak for fall migration activity, but like previous years the variety and numbers of species was far from spectacular. Common shorebirds were present in moderate numbers with the only significant buildup occurring for snipe. Peak numbers of 200-250 were reported in late September with 100 observed within a small area of Pool 8 on the 24th. Sora rails were joined by Virginia rails sometime in December.

Relatively few observations of gulls and terns occurred on the refuge during the year. A few ring-billed gulls were present beginning in late March, followed by the arrival of black and Forester's terns early in May. Black terns were the most common of this group with peak activity noted in early June. Scattered sightings of gulls, California and/or ring-billed, were made as late as the first week of October.

Although not stopping on the refuge, a rare observation of white pelicans was made of four birds flying south over the refuge on May 23.

Doves

No significant change in mourning dove use occurred in 1970. The first sighting occurred on April 7, about three weeks earlier than the first observation of 1969.

The dove population gradually increased through the spring and summer months and after an estimated production of 30-40 young, peaked at 200 in mid August. Numbers remained relatively high through September, gradually decreasing thereafter.

The last reported sighting was made on November 26, when eight were observed east of Pool 8.

B. Upland Game Birds

Ring-necked pheasants are the most abundant upland game bird on the refuge, but somehow have not been able to increase to the potential of the habitat. Winter carry-over was good and at least five territorial roosters were heard during the spring. Estimated production from 65 young along with 50 State released hens brought the refuge population as high as 120 during the fall period.

In spite of excellent refuge food and cover conditions in 1970 the population did not show any significant gains over last year. Valley populations are at the very lowest due to land use activity which has reduced pheasant cover and food.

Hungarian (Gray) partridge were not present on the refuge until the late fall period when birds made their seasonal movement down from the foothills. Two November observations were made in the west portion of tract 25, one of seven birds, and the other of a pair. Increased use probably occurred in 1970 as no on-refuge sightings were made last year.

Ruffed grouse were increasingly apparent as the year progressed. Three spring sightings were made in the tract 27 area, followed by two summer brood observations. During the period of greatest use the population was estimated at 15-20. Prior to 1970 very few, if any, sightings of grouse were made on refuge lands. Slight increases in numbers are anticipated through controlled burning and other woodland management activity in the north refuge area.

C. Big Game

White-tailed deer numbers increased during the year and the 35 reported during the period of greatest use is the highest since the refuge was established. On March 28 a total of 20 different deer were counted in the area west of Pool 10 alone. The high population at that time reflected the annual influx back onto the refuge after the winter period.

Food and cover conditions were reflected by the high percentage of twin fawns in the population. Four sets of twins were raised from the total refuge production of 10. This represents an increase of two over last year's figure and production is expected to continue to climb in the next few years as habitat improvement progresses.

Deer use was widespread in 1970 with the animals regularly moving between the western brush/timber zone and the agricultural area in the eastern portion of the refuge. The most notable increase in use occurred in tract 27 where a 35 acre controlled burn greatly improved browse conditions.

In spite of the addition of a second hunting zone and a substantial increase in hunting pressure, no deer were reported shot by archers in 1970. One known road kill occurred on the East Side Highway on the northeast boundary of the refuge and some off refuge gun-kill likely occurred.

D. Fur Animals, Predators, Rodents and Other Mammals

Muskrat numbers remained below desired levels during the year but the population showed a significant increase in 1970. The population is estimated at between 150 and 200 after an early season scare of a die-off.

Pools 8 and 10, the Burnt Fork diversion system, and Swamp Creek drainage all showed signs of increasing muskrat numbers. Marsh management benefits from these animals is most notable in the Pool 10 seepage area. The increased number of rat houses is apparent and should provide increasing benefits to loafing and possibly nesting waterfowl. All major pools except 8 are being maintained at pre-winter levels to prevent winter kill of the population.

Mink or mink tracks were seldom seen throughout the year and the population has remained relatively stable. Between 30 and 40 animals are thought to exist on the refuge.

Beaver activity was confined primarily to the oxbow/diversion system south of the Bass Creek crossing area. Some use also occurred in the oxbow which passes through tract 27 but the use likely is by animals residing along the river. Old beaver damming activity is still providing waterfowl habitat in scattered locations on the refuge.

River otter are making increasing appearances on the refuge as evidenced by the number of tracks. The first reported refuge observation was made on May 20 when a single animal was observed eating fish about 100 yards southwest of Pool 10 control. Tracks in the Pool 10 area indicate that this unit is the principal use area along with the Bitterroot River.

Raccoon numbers have changed little from last year. Generally tracks were observed scattered throughout the refuge and only a few observations were made of these largely nocturnal animals. It is thought that most of the raccoons make their home in the timbered area along the river and make nightly hunting trips to major pools in the east portion of the refuge. The population probably did not exceed 20 during the year.

Striped skunks continued as the most abundant predator and during the period of greatest use numbered between 50 and 60. A total of 23 were removed as nuisance animals. At least 11 skunks were disrupted from under a tract 27 hunter shack during cleanup operations.

Red fox numbers appeared to decrease slightly during 1970, partially due to the winter removal of nine animals on the Hagen land adjacent to the east boundary of the refuge. Only three dens were located compared to five the year before.

Considerable fox activity occurred in the south end of tract 27 where, ironically, considerable late season pheasant use was occurring. This year's population was estimated at 10-15 with periodic movements on and off the refuge.

Rodent numbers continued high due to excellent ground cover conditions. Sightings, tracks, and burrowing activity indicated that foxes and predatory birds had an ample supply of food throughout the year.

Red squirrel, Columbian ground squirrel, yellow-bellied marmot, badger, and porcupine were present in numbers similar to last year. Ground squirrels were by far the most abundant of these mammals and caused minor concern to agricultural activity.

E. Hawks, Eagles, Owls, Crows, Ravens and Magpies

Details of predatory bird use in 1970 are noted on NR-1A's. No unusual or large buildup of hawks occurred on the refuge this year with the three most common hawks, sparrow, marsh and red-tailed, present in each of the three reporting periods. The latter two were first observed in early March, followed by the later arrival of marsh hawks and a single pigeon hawk in late April.

A red-tailed hawk nest in the southwest margin of Pool 10 produced the only known young of this species, and some production also occurred from marsh and sparrow hawks. Rough-legged hawks were present in January, making a return appearance during the month of August. One or two sharp-shinned hawks were also present for a brief period in late August.

In addition to the three most common hawks, a few Cooper's and Harlan's hawks were present on the refuge from mid December until the end of the year. Peak fall hawk activity occurred during the month of September along with the presence of fair numbers of sparrow hawks.

Ospreys first made their return to the refuge on April 18 when a pair began improving the nest on a goose platform in Pool 10. Two young hatched on July 14, were fledged, and the family was last seen sometime in early September. Three active nests were known to exist in the valley, one occurring north of the refuge along the East Side Highway where the pair of osprey moved in the day after seven young goslings had left the nest.

Eagles were represented only by bald eagles in 1970. A single bird was sighted on January 6 and as many as two consistently used the refuge until the first of March. A single bird made an early return in mid November and two utilized the area from mid December to the end of the year.

Turkey vulture use continued its upward trend in 1970 with observations made in all three reporting periods. As in the past, their visits were brief but noticeable. Four were reported in late April, 5 in mid June, and the last appearance occurred in early September when 3 were sighted.

Owl activity followed patterns of previous years. Great horned owls represented the only resident species and two nests were known to occur. Short-eared owls were the second most common of these predatory birds with peak activity noted during the winter months. A rare sighting of a pygmy owl was made on tract 27 on December 10 and several other sightings were reported throughout the valley area.

Crow and raven use of the refuge was intermittent with total numbers never excessive. Peak activity periods for ravens were reported for January and February, late September, and again in late November. Crow use was more general beginning in March.

Magpies showed no significant change from last year and provided the most refuge use of any of the species in this category. Magpie were present throughout the year and were thought to raise a considerable number of young. Peak activity was noted in October when up to 200 were present on the area, many of them utilizing a major roost area in the south end of tract 27.

F. Other Birds

No unusual sightings of birds in this category were made during the year. The present refuge list still contains a total of 163 species plus a listing of 15 new birds to be added in the first revision. Area ornithological groups are expected to add to the new listing.

Common winter birds included white-breasted nuthatches, chickadees, and hairy, downy, and pileated woodpeckers. These species were joined in February by meadowlarks, robins and tree swallows due to mild and open winter weather. Colder weather delayed the major spring migration until April when most of the species common to the area arrived. During the period a major movement of swallows occurred in late March, and an estimated 12-15,000 red-winged blackbirds were observed east of Pool 8 on March 28.

Later arriving species included kingbirds in mid May and a major migration of nighthawks in mid June. All other movements and numbers of birds were normal and/or less significant. Clark's nutcrackers made their usual September appearance and shrikes were first observed in late October.

The Christmas bird count, a large part of which was conducted on the refuge, showed a total of 53 species and 5,720 individual birds in 1970. This represented a slight decrease from 1969 when 57 species and 6,680 birds were observed.

The refuge bird list in the 1969 Narrative Report contains the current listing and status of all bird species.

G. Fish

The trophy size of trout in refuge pools was verified this year. Personnel from the University of Montana gill-netted samples of trout from Pool 4 to test for levels of mercury and other solid metals in the tissue. A total of 12 brook and brown trout were removed, the largest a brown trout weighing 5.9 pounds. Comparisons of sizes to other trout seen, mainly in pools 4-6, 8 and 10, indicates that previous 10 pound size estimates are realistic.

A small population of largemouth bass in a tract 27 pond perished as a result of lowered water levels for construction work; however, bass along with sunfish have been observed in Pool 10 during the year. A mixture of several species of suckers and minnows are thought to be present in most refuge pools. The Bitterroot River and related oxbows also contain whitefish, squawfish, and rainbow and cutthroat trout.

Further attempts have been made to make the fishery resource available for public use through a transplanting program. The possibility exists that such a program can be worked out through the local sportsmen's organizations. Public fishing must continue to be restricted to the Bitterroot River and Burnt Fork Oxbow to prevent conflict with refuge waterfowl objectives.

H. Reptiles and Amphibians

The most notable of these wildlife species is the painted turtle. Large numbers of these reptiles are observed, particularly along the west side of the refuge where oxbows and fallen brush and timber are prevalent. Snakes are uncommon and are rarely seen.

Amphibians are represented primarily by frogs which are more often heard than seen. Several species are thought to be present on the refuge, the most significant being bull frogs which are reported to be rare in the valley. One was distinctly heard in the Pool 8 area this spring.

I. Diseases

No wildlife diseases were noted on the refuge in 1970 and no significant die-offs were reported in the valley area.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. Physical Development

Buildings

In addition to normal maintenance activities to refuge buildings major remodeling was completed on Quarters 2. Two bedrooms were added within an existing, attached garage to make the unit a functional three-bedroom home. Significant minor buildings activity included:

Painting and alterations to stairs and dock of wooden granary.
Exterior painting of Q-2
Interior painting of Q-2, five rooms
Complete interior painting of Q-1
Exterior painting of storage shed, subheadquarters area.
Service and minor repairs of quarters furnaces

During the latter part of January the refuge occupied new leased office space adjacent to the old rental space. The new office with added restroom facilities is more pleasing and is working out quite well.

Equipment

The usual amount of minor maintenance was completed on most refuge equipment. These significant equipment activities are noted:

Roll bar constructed on TD-14 dozer
Minor overhaul of D-7 dozer (head leak)
Hydraulic system added to Farmall tractor
Seat belts placed on all tractors
Replacement of broken axle in Adams grader

Water Facilities and Roads

Considerable manpower and funds were expended on a maintenance program involving 6.7 miles of dike, 37 water controls and nearly 13 miles of gravelled dike and access roads. Additional time was required to clean and maintain one and a half miles of ditch supplying water to refuge grass and cropland.

These major water and road facility activities were completed during the year:

Rock riprapped 1200' of dike in NW portions of pools 1-3.
Further raised Pool 8 dike with 2500 yds. of fill (contract).
Installed 3 controls: Tr. 11 and Swamp Cr. pools, Tr. 13 bypass.
Constructed 3800' of dike (28,000 yds.) for 55 A., Pool 12--controls, islands.
Constructed temporary flood levee on Tr. 25 oxbow origin.
Dug 31 duck production potholes--8 & 10 seepage areas, Tr. 21.
Constructed 8 small water spreading dams in Tr. 11 & 21.
Gravelled 1.5 miles of West River road in Tr. 25.
Gravelled 1 mile of Pool 8 and 12 dikes.

A refuge source of gravel was made available to the County for improving the base on about one mile of county road adjacent to and within the boundaries of the refuge.

Other

The topographic survey was completed on about 350 acres of tract 27 prior to refuge improvement work in that unit. Refuge staff assisted Engineering Division personnel from the Regional Office in the March-April project.

About 3.5 miles of old or obsolete fence was removed during the year and replaced by .8 mile of new fence. Maintenance activities on over 20 miles of fence and boundary posting required minimum attention.

B. Plantings

Two cooperative farmers completed most of the refuge agricultural operations again during 1970. A total of 299 acres were under cultivation, only three of which were a result of refuge financed activity. Cooperative activity included planting and/or harvesting 106 acres of barley and 63 acres of wheat, and fall planting of 87 summer fallowed acres to winter wheat. An additional 37 acres of alfalfa in the last year of a hay/grain rotation was irrigated and harvested in two cuttings.

Most of the refuge share of 169 acres of grain was left standing in the fields with only 150 bushel harvested and stored for banding and emergency feeding. The balance of the refuge's one-third share was left in alternate strips. Yields were lower in 1970 but 3,650 bushels of grain were available for wintering waterfowl on nearly 54 acres. Cooperators shares for 114 acres was estimated at 7,870 bushel.

Grain yields from barley were similar to last year with most units producing between 60 and 70 bushels per acre. This was due mainly to heavy July rains which delayed some normal September harvest of grain until October. Gaines winter wheat averaged 80 bushel per acre, down considerably from the 100 bushel reported last year.

Deer and pheasant use of various food and cover conditions in cropland units was good throughout the year. Fall planted wheat in 1969 was best utilized by geese early in the year and duck use of grain began in late November, about three weeks earlier than last year. Most of 1969's grain crop was utilized by spring.

Summer fallowing activity on 90 acres showed good weed control benefits and aided fall planting of 67 acres of winter wheat. Goose browse benefits are anticipated during the late winter and spring period in 1971. Two of the acres (tract 21 plot) were planted at a heavier seeding rate and are scheduled for a grass/legume cover planting in 1971. A one acre plot in tract 27 was fall planted with a mixture of ladino and white dutch clover, and timothy. Deer browse and grouse cover benefits will result.

Continued good productivity of refuge agricultural units was again attributed to a balanced program of fallowing, fertilization, chemical weed control and irrigation. Due to fallowing activity on potentially irrigated cropland only 70 acres were flood or sprinkler irrigated in 1970. Most of the remaining units received sub-irrigation benefits from the high water table in the main refuge river floodplain.

Grass plantings of various mixtures of crested and intermediate wheatgrasses, ladino and white dutch clovers, and timothy were made on seven acres during late October-early November. Areas seeded included Pool 12 dike, nesting islands, water spreading dikes, and seven waste and borrow areas. Improved wildlife cover and erosion control are the principal benefits sought.

No new woody cover plantings were made during the year; however, a site for a 1971 planting has been prepared in southeast tract 21. Old plantings of Russian olive, caragana, and honeysuckle have maintained 75-80 percent survival through cultivation and watering during the year.

A bulrush transplant project to establish improved waterfowl brood cover is reported under III. C.

C. Collections and Receipts

The only non-seed collection or receipt during 1970 was of 75 bulrush rootstocks which were removed from Pool 2 for transplanting to other refuge pools. The transplant was an effort to establish better

brood cover in the open water areas of Pools 2, 3 and 5. Success of the early July project will be determined and reported in subsequent years' reports.

A total of 340 pounds of seed was received during the year (NR 7 and 8a) for use in food and cover plantings which are reported under Plantings, III., B.

D. Control of Vegetation

A total of 271 acres were treated chemically for weed control in 1970 with an additional five acres mechanically treated. Experimental controlled burns were also undertaken on test plots to determine the effects on such noxious weeds as Canadian and Scotch thistle, and knapweed (see Planned Burning).

About 170 acres of barley and wheat crops were sprayed with 2,4-D PGBEE at the rate of .25 pound per acre. Sharecroppers applied the chemical in late May and early June to control annual broadleafs, notably mustards. Control effects varied with later sprayed units, particularly A19-1, the least successful. Control was estimated to be 80-90 percent successful on the primary target species but also reduced competition from thistles.

The Ravalli County Weed Control Board was contracted to spray 101 acres of refuge grassland, roads and dikes with 2,4-D DMS at the rate of one pound per acre. About 56 acres of G-19 was sprayed at the expense of the Forest Service which utilizes the pasture under a free-use permit. Control efforts on the unit over the past three years have been 80 percent effective.

The balance of the acreage included dike and road berms, disturbed plots and waste agricultural land. The 45 acres was scattered throughout the refuge and the principal target species were Scotch and Canadian thistles. Dense infestations along dikes in the south portion of the refuge showed the best results with estimated control for all locations 65-75 percent. Continued spraying will be necessary for complete control due to the light application rate. Increasing grass vigor is expected to aid in the reduction of noxious weed species on the refuge.

Chemical control activities were supplemented by mowing on about five additional acres for thistle control. The TD-14 dozer was used to remove watercress from 300 feet of the South Drain as part of the annual maintenance of this water conveyance facility.

Vegetative control activities in the future will revolve around control of noxious and pest weeds. Although providing valuable wildlife food and cover, control efforts will be necessary to protect adjacent landowners from recurring infestations. Hopefully other techniques will replace chemical control on refuge acreage.

E. Planned Burning

Six controlled burns were conducted during the spring on units varying in size from a fraction of an acre to 35 acres. A total of 52 acres was burned as a cover improvement technique for grassland, brush and timber, and experimentally as a weed control practice. In addition 125 acres of grain stubble in refuge agricultural units were burned to facilitate farming operations. Irrigation ditches were also burned to maintain water flow from the Supply Ditch.

On February 19 a burn was conducted on a 10 acre sedge/grass flat along the southeast edge of Pool 10 to encourage resprouting of goose browse. Rising humidity in late afternoon resulted in a spotty burn on about five acres of the unit. Limited goose use was made of the area.

The most rewarding controlled burn was conducted on 35 acres of brush and timberland in the west portion of tract 27. Fire weather on May 6 was ideal with the necessary winds to carry fire through the unit and continued high winds and burning snags necessitated frequent checks of the area through the night.

The fire was extremely hot, eliminating 60-65 percent of the downed brush and timber, and setting back over-mature growth of desired deer browse species. Resprouting of three key brush species was profuse and utilization by deer was excellent throughout the balance of the year. Cost of the burn was $150.

Three smaller burns were conducted to test the effects of fire on noxious weeds and quackgrass infestations. A one acre fire on Pool 3 west dike, and a half acre burn in south tract 21 greatly reduced thistle infestations on those sites. A small quackgrass test plot was burned in late May which had a retarding effect on the growth of both quackgrass and knapweed. Further burning and evaluation will be necessary but after one growing season no desired native grass species were apparent.

A 10 acre burn on the benchland east of Pool 2 removed considerable old vegetation and caused resprouting grass growth which was used heavily by Canada geese. Long term benefits should include fewer noxious weeds and improved grass growth.

F. Fires

Refuge fire hazard was low until the first of August and the beginning of a month-long dry spell. No uncontrolled fires occurred in spite of dry August weather and considerable fall public use of the area.

IV. RESOURCE MANAGEMENT

A. Grazing

Five permits were issued during the year for grazing 101 head of stock (excluding calves from 75 head of cattle). Total revenue from the 471 AUM's utilized amounted to $1,293.51. The Stevensville district of the U. S. Forest Service was again issued a free-use permit for 14 head of horses and mules used in their forest operations.

The grazing season ran from May 15 through November 15 but 90 percent of the stock were off the refuge by October 15. The turn-in date seems desirable from the standpoint of wildlife cover; however, the late turn-out date results in utilization of forage long after termination of the growing season.

Only one cattle permit (Moody, 49-70) was issued during the year as grazing was deferred on G-25 where a total of 60 acres of this previously heavily used pasture was fertilized with 200 pounds per acre of 27-12-0. Permit 49-70 provided grazing for 45 head in G-12 and 30 head in G-10 and 11. Forage growth on the units was good due to flood and sub-irrigation on most of the acreage, leaving ample cover after the grazing season.

Three of the permits were issued for grazing a total of 12 head of horses and stocking was well below the stocking rate for the three small units. Grass cover continued to improve on G-19 due to a light stocking rate and weed control activities by the Forest Service.

The refuge grazing program will undergo minor alterations to provide a balance between forage and cover demands. Light grazing pressure, fertilization, and deferred grazing will be utilized to improve vegetative growth and build soils.

B. Haying

The single refuge haying operation was regulated under a cooperative farming agreement with Robert McElhaney. Two cuttings were taken from 37 acres of alfalfa hay in units A20- 2 and -3. Revenue from the 104.32 tons of hay amounted to $625.92.

Regular flood and sprinkler irrigation activity plus uncontrolled cutting dates resulted in very little wildlife benefit from the three year old planting. The units were originally scheduled for fallowing next summer; however, they now will be maintained as nesting cover for the 1971 season. Additional wildlife cover plantings on surplus farming ground will replace plantings made for hay crops until such time that more grain acreage is required.

C. Fur Harvest

Principal furbearers, muskrat and mink, are present in limited numbers and a trapping season was not justified in 1970. Low beaver and river otter populations will be protected for their aesthetic values.

D. Timber Removal

No commercial timber was removed in 1970. However, 40,000 board feet of Ponderosa pine has been scaled and put up for bid with assistance from the Forest Service. A high bid of $10.12 per thousand was received for the timber which lies within the flood basin of newly constructed Pool 12. Detailed reporting will appear in the 1971 narrative.

Remaining refuge timber will be retained for upland habitat and aesthetic values. Several free use permits were issued to salvage firewood from dead and downed timber on the refuge.

E. Commercial Fishing

None

F. Other Uses

An apiary containing 60 hives was operated near the south boundary by permittee Walter Morris (Permit 45-70). Total revenue was $15.00.

The hives, strategically located on high ground in an old apple orchard and near a substantial acreage of desired knapweed, may have to be moved due to continued conflict with an adjoining neighbor.

V. FIELD INVESTIGATIONS OR APPLIED RESEARCH

A. Progress Report

No formal, outlined study projects are in progress at this refuge. Reports for refuge biological activities are reported below.

B. Banding

Ravalli was within the area designated for 1,000 mallard post-season and pre-season bandings in 1970. Plans were to split the quota between the Bison Range and Ravalli; however, varied success altered banding accomplishments.

Post season banding was completed between January 14 and February 9, 1970, with 730 mallards banded during a two-phase operation. During a four-day trapping session 528 were banded, after which the traps were closed to allow the Bison Range to fill the rest of Western Montana quota. Difficulties there led to the additional banding at Ravalli. Cost per duck was sixty cents for the winter banding effort.

The first refuge pre-season mallard banding was undertaken in 1970 with 298 banded at a cost of $1.00 per bird. The delayed late September/early October effort fell far short of the desired 500.

All trapping was accomplished with five baited, funnel traps with the highest success occurring on Pool 8 for winter banding, and on Pool 10 for the pre-season effort.

In an effort to learn more about the Bitterroot Valley local Canada goose population a banding program was initiated on the refuge in 1970. Time-consuming drive trapping efforts yielded a total of 15 local birds from Pool 10 in late June. Important information is expected from this and subsequent bandings.

Summary of Three-Year Post Season Banding at Ravalli*

	1968	1969	1970	Total	No. Recoveries
Mallard	735	231	730	1,696	117
Pintail	9	5	0	14	0
Shoveler	1	0	0	1	0
Widgeon	1	0	0	1	0
Green-winged teal	0	1	0	1	0
Totals	746	237	730	1,713	117

*Post season mallard quota for western Montana dropped early in 1971.

No recent banding recovery summary is available; however, indications are that there has been little change in recovery percentages or locations. There is a predominantly Montana harvest on winter banded mallards with the principal harvest occurring within the Bitterroot Valley. No recoveries have been received from Canada geese, and only 13 from pre-season banded mallards as of this date (all Bitterroot Valley).

C. Wood Duck Nest Boxes

The first systematic check of wood duck boxes was completed in March of 1970 and revealed 37 boxes instead of the estimated 50-60 reported in last year's report. Five had some duck laying activity with only three hatching young during the 1969 nesting season.

Post nesting season checks in 1970 showed that 14 had duck activity with 11 (29.7%) hatching ducks. Hooded mergansers utilized seven boxes (all but one hatching); wood ducks, four; and mallard, one. Two dump nests were discovered with goldeneye and merganser eggs.

Starlings and swallows provided the major competition for nesting ducks as 14 boxes had some activity by these two species. To reduce competition from starlings 13 boxes were relocated during the March maintenance checks which apparently contributed to the substantial increased duck use in 1970. In the relocation effort emphasis was placed on clustering around previously used boxes, and placement of the metal cone type on north sides of trees and in shaded areas.

A few additional boxes will be moved this coming winter and seven new ones will be placed in the recently developed Pool 12 area. Potential for wood duck and merganser production on the refuge and in the valley is great and efforts are being made to expand the nest-box program beyond the refuge boundaries through private participation.

D. Artificial Nesting Sites for Geese

Three basic types of man made nesting sites were again available for use during the 1970 nesting season with each receiving some use. Earthen islands, treetop platforms, and nest platforms on legs placed over the marsh were checked for usage in late April and early May. A total of six nests, all on artificial nest sites, were located on the refuge including one renesting attempt.

Of the 75 earthen nesting islands located in all major pools except Pool 8, only one was used for nesting. The nest located in Pool 2 was thought to be the only refuge ground nesting attempt. An additional 25 islands have been eroded down by wave action and are serving solely as loafing sites for waterfowl.

Not all of the 30 treetop platforms were suitable for nesting geese in 1970, due to poor site location and the inability to service all of the structures during March checks. Nesting material was considerably depleted in many of the platforms but four were used with all three initial nesting attempts successful. All nests were located in Pool 10 where the majority of the platforms had been placed.

Six of the eight over-water platforms were suitable for nesting geese, with one used and successfully hatching young. It was the second successive year of use for the platform located on the west side of Pool 8.

Treetop platforms are proving to be the most acceptable for nesting geese; however, maintenance of this type of structure gets progressively more hazardous as the trees decay. Additional platforms will be added to new impoundments and old ones will be maintained as long as is safely possible. As they become unavailable, hopefully a much larger nesting population will be forced into other refuge nesting situations that should prove equally successful.

E. Canada Goose Study

A thesis entitled "Reproductive Success of Canada Geese in the Bitterroot Valley, Montana," is on file in the refuge library. The work done by Dennis Flath of the University of Montana encompassed the entire valley but considerable data was derived from the refuge, particularly during the last year of the two-year study. Some of the high points of the project are mentioned below.

During the two years of the study (1969-70) the breeding population contained 110-130 geese, 45-50 percent of which were reproductively active. The breeding population was fairly evenly distributed throughout the entire Bitterroot Valley with the exception that 20 percent utilized the refuge.

Valley Canada geese prefer aerial nesting sites as tree sites were chosen in a 2:1 ratio over ground sites. Clutches, which averaged 5.88 for 16 nests, were apparently larger and more successful for tree nests. Nesting success (21 nests) was 81 percent, and hatching success for 90.4 percent with the total estimated production between 103 and 127 goslings each year.

VI. PUBLIC RELATIONS

A. Recreational Uses

The 1970 summary of recreational use gives a detailed breakdown of activities for the year. The summary is from data compiled from the Monthly Recreational Use Reports.

Reported refuge visits for the year were down close to 3,000 from last year; however, all duplication of multiple-activity visits was eliminated in 1970 and use for the two years was thought to be comparable. A total of 12,678 visits was reported for the year compared to the 15,687 registered in 1969.

Wildlife observation, wildlife tours/routes, and visitor contact stations accounted for 9,590 or 75 percent of the total refuge visits in 1970, with most of the use occurring as the result of opportunities along the three mile segment of county road. The road passes through a representative sample of refuge habitat and display of management activities, and also provides three historical visitor contact stations.

Many of the other recreational activities were valuable in contributing to wildlife-related experiences. The Burnt Fork picnic and river access accounted for nearly 1200 visits for picnicking, camping, and fishing activities. Special camping use was permitted for organized youth groups only.

The 555 fishing visits recorded in 1970 showed a slight increase over last year. Winter whitefishing and summer trout fishing provide the attraction for refuge fishing use.

Refuge hunting activity is reported in greater detail in Section VI, D. A total of 1,795 hunter visits (14% of total visits) was reported for the calendar year, with an additional 120 occurring in January 1971 during the last ten days of the 1970-71 waterfowl season. The increase of 303 visits (21.5%) over last year accounted for nearly a 200 percent increase in total hours use. Also significant was the 50 big game visits reported compared to only two in 1969.

Not included in the recreational use total are educational visits by school and organized adult and youth groups. Although principally educational in nature, the 911 visits provided a certain amount of recreational value to the participants.

Growing public awareness of the refuge is expected to result in continued increases in recreational use of the area. Additional planning and regulation of the public use program is increasingly important in providing quality wildlife experiences.

B. Refuge Visitors

A total of 44 official visitors was recorded in the bound office ledger in 1970. Twenty-eight government visits are listed, and 12 were made by University of Montana personnel regarding studies or educational use of the refuge. Most of the governmental visits involved some facet of refuge management or refuge problem. Seven were made by the S.C.S. and six by Montana Fish and Game personnel.

Some official entries have inadvertently been missed; however, the listing is thought to be relatively complete. Recreational visits, as well as permittee and cooperator visits, have been purposefully omitted from this listing.

C. Refuge Participation

Refuge participation in public relations activities more than doubled last years efforts. A total of 68 organized groups and 3,296 people were accommodated on tours, talks, management lectures, wildlife counts, and slide showings during the year. An additional six meetings were attended.

As in previous years the peak in tour group activity occurred during the spring prior to the end of the school year. School groups accounted for 29 of the 37 organized tours and indicated the growing emphasis on environmental awareness in the school systems.

The addition of a new slide projector aided in increasing and spreading out refuge participation activities in 1970. A total of 18 slide talks were presented to nearly 2,000 people, almost double the number of contacts for all activities last year. During National Wildlife Week in March, 13 such slide showings were given to 1,870 Bitterroot Valley grade and high school students.

Other significant refuge participation during the year included: an extended Stevensville High School ecology field trip in which the manager served as an advisor; manager serving as guest speaker at the Stevensville High School Honor Banquet in which an environmental speech was presented to 100; and the showing of a refuge float in the annual Creamery Picnic parade.

In an effort to establish a refuge environmental education program for the schools, local educators have been encouraged to incorporate the use of the refuge into their teaching programs. Six formalized wildlife lectures were also given to high school and university students during the year.

Refuge participation for 1970 has been recorded in a bound office ledger. The following is a general breakdown by broad activities:

Activity	Number	Participants
Tours:		
School groups (pre-college)	21	525
University and Vocational	8	145
Organized youth	6	112
Ornithological	2	27
Slide showings/talk	18	1999
Lectures	6	180
Other	7	308
Totals	68	3296

During the year seven news releases were prepared and sent to four area newspapers. Captioned photographs accompanied three of the releases, and four photos were also utilized as wildlife fillers. An additional 40-45 contacts were made with the news media resulting in news items regarding some phase of refuge operations.

D. Hunting

A total of 1,195 acres, or 45 percent of the total refuge acreage, was opened to some form of hunting during 1970. Archery deer hunting was the only activity allowed on the entire open acreage, with waterfowl and pheasant hunting restricted to the south zone which was comprised of 654 acres (24.5% of the refuge acres).

Hunting opportunities, pressure, and success were generally improved during the 1970 hunting seasons. A total of 1,915 hunter visits resulted in over 5,400 hours of recreation. Hunting of waterfowl, migratory game birds, pheasants, and deer (archery only) was permitted in accordance with State regulations and season dates. Details of individual hunting activities are provided below.

Waterfowl

A 90 day duck season was available from October 10 to January 10, 1971 while the goose season, with the same opening, closed on December 6. A more liberal limit was in effect for the seasons with daily limits of six ducks (any spp.) and six geese (two Canadas). An additional season limit of six Canada geese was imposed on waterfowl hunters west of the continental divide.

Increased numbers of waterfowl coupled with periodic periods of harsh weather resulted in increased harvest over last year. A total of 1810 waterfowl hunters took home 1.1 ducks per hunter with total refuge waterfowl kill (including crippling losses) increasing from 1450 to 2475 birds in 1970. Few, but increased numbers of geese were taken from the refuge.

As in past years hunter success was best early in the season. Hunter success was 3.1 birds per hunter on the opening day when 167 ducks were reported and during the first week 125 hunters reported 243 ducks, 1.9 per hunter. Hunter success dropped considerably until frontal systems in late November and mid December caused a pickup in hunter activity and success.

In the total projected waterfowl kill of 2,475, a crippling loss of 20 percent was used as the reported loss of 15.2 percent was thought to be low.

Mallards were the most common bird in hunters bags with 757 (70.4%) reported in the total of 1,076 ducks. Beginning in mid November there was a significant increase in the percentage of mallards in the bag. About 14.5 percent of the total refuge kill was on teal, widgeon and pintail, most of which were reported early in the season.

Goose hunting opportunities on the refuge were again limited due to restricted flights and relatively small populations. Only nine Canadas and four snow and/or Ross' geese were reported shot on the refuge. The number bagged represents an increase over last year but the main valley goose harvest still occurs off the refuge. Total goose harvest for the valley probably did not exceed 75-100 birds.

Other migratory bird hunting was limited to snipe and only a few of these birds were taken incidental to waterfowl hunting activity. Total harvest probably did not exceed 20-25 birds.

Pheasant

The State pheasant season ran from October 24 through November 29 with a bag limit of three, one of which could be a hen. In spite of a State release of 50 hens to supplement the small, refuge wild population, only about 15 were thought to be harvested.

Of the total of 55 upland game hunting visits most occurred during the early part of the season. Throughout the latter part, pheasant hunting was largely incidental to waterfowl hunting activity.

Hunting was, and probably always will be, marginal on the refuge unless the State can justify annual, both-sex, pheasant releases for the area.

Archery Deer

The riverbottom archery deer season (Zone 260) extended from September 15 through November 30. With the additional opening of 541 acres in the north refuge area a total of 45 percent of the refuge was available for pursuit of this activity. About 50 archer visits contributed nearly 150 hours of "quality" recreational use even though no deer were known to be taken.

E. Violations

Patrol and enforcement activity on the refuge required considerable time, principally during the fall hunting seasons. One member of the refuge enforcement staff of two was on duty throughout the waterfowl season.

A total of 20 cases were handled through the courts with an additional 23 official warnings issued, mainly to juveniles. Disposition of all court cases resulted in total fines of $418 (plus $35 court costs), plus a 10-hour work sentence levied on one Missoula juvenile. Juvenile warnings were handled by a discussion with the youths and contacts with their parents.

Late shooting and closed area violations were about equally represented in the list of apprehensions made. The frequency of violations decreased as the season progressed due to increased public knowledge of enforcement activities, and a decrease in the number of University student hunters. College-age hunters ranked high on the list as the most frequent violators.

The following is a summary of violations occurring during 1970:

Violations	Court Cases	Warnings
Late shooting	10	12
Hunt waterfowl in closed area	6*	6
Rifle hunt in archery deer zone	4	-
Trespass	-	3
License violations	1*	2
Totals	20*	23

*One case involved closed area and license violation

Two additional closed area violations were made by a Montana Fish and Game Warden working the area.

The majority of the closed area cases resulted from the opening of the north refuge zone to archery deer hunting in 1970. Failure of hunters to understand State regulations or to properly read the boundary posting was the reason for the large number of violations in this category.

Decreased fall swan use nearly eliminated the threat of swan shooting in 1970; however, a single disabled swan was seen shot by several observing hunters, none of whom would testify in court. This is the second such swan shooting in three years in which people were not interested enough to get "involved."

Bureau of Sport Fisheries and Wildlife
Division of Wildlife Refuges

SUMMARY -- 1970

MONTHLY RECREATIONAL USE REPORT

Refuge name: Ravalli
State: Montana

State Code 26 (1-2) | Congressional District Code 01 (3-4) | Refuge Code 137 (5-7) | Report Period Yr. 70 Mo. -- (8-11)

(Card Columns). . . . . (12-13) (14-18) (19-25) ACTIVITY	Code	VISITS FOR THE MONTH Total Number	Total Hours
Hunting: Big Game	01	50	145
Upland Game	02	55	75
Waterfowl	03	1,690	4,890
Other Migratory	04		
Other	05		
Bow	06	50	145
Fishing: Salt Water	07		
Warm Water	08		
Cold Water	09	555	1,330
Environmental Education	10	172	315
Wildlife Photography	11	6	14
dlife Observation	12	9,590	11,650
Conducted Programs	13		
Field Trials	14	30	250
Wildlife Trails	15		
Wildlife Tours/Routes	16	9,590	11,650
Visitor Contact Stations	17	1,020	275
Camping (wildlife related)	18	50	60
Picnicking (wildlife related)	19	445	430
Wildlife Interpretive Center	20		
Off-Site Programs	21	2,291	133

(Card Columns). . . . . (12-13) (14-18) (19-25) ACTIVITY	Code	VISITS FOR THE MONTH Total Number	Total Hours
On-Site Programs	22	911	79
*Miscellaneous Wildlife	23	223	257
Swimming	24		
Boating	25		
Water Skiing	26		
Camping	27		
Group Camping	28	35	560
Picnicking	29	80	90
Horseback Riding	30	77	127
Bicycling	31	70	100
Winter Sports	32		
Fruit, Nut and Vegetable Collecting	33		
*Miscellaneous Non-Wildlife	34	33	66
Peak Load Day	35	180--July	
Actual Visits	36	12,678	
Fee Area Use	37		
Number of Fee Areas	38	(14-18)	
Fee Collections	39	$	
Collection Costs	40	$	

Form 3-123
(Revised July 1969)

*Use reverse side to indicate types of activities summarized under miscellaneous codes 23 and 34. MAKE NO OTHER ENTRIES ON FACE OF THIS FORM.

VII. OTHER ITEMS

A. Items of Interest

The refuge family has grown by two during the year. On August 3 the Lipke's brought their first son, Jeffrey Allen (8 lbs., 13 oz.), into the refuge fold.

Grandparents Mr. and Mrs. Anderson were also proud as punch of a new granddaughter born to their son Bill and his wife on July 21 (their first grandchild). The Andersons also moved during the year to a new home about one mile east of the refuge.

B. Photographs

All photos were taken by Manager Lipke.

C. Narrative Credits

Much of the time consuming effort of data summarization was completed by Mrs. Anderson, in addition to the excellent job of typing and assembly of the report.

NR forms, photo captions and entire narrative section - Lipke.

SIGNATURE PAGE

Submitted by:

Howard A. Lipke
(Signature)

Refuge Manager
(title)

Date: February 18, 1971

Approved, Regional Office:

Date: 7-1-71

(Signature)

Asst. Ref. Supvr.
(Title)

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE RAVALLI MONTHS OF JANUARY TO MAY, 1950

(1) Species	(2) Weeks of reporting period									
	1/1-10 : 1	1/11-17 : 2	1/18-24 : 3	1/25-31 : 4	2/1-7 : 5	2/8-14 : 6	2/15-21 : 7	2/22-28 : 8	3/1-7 : 9	3/8-14 : 10
Swans:										
Whistling								5	200	95
Trumpeter										
Geese:			← 20 to 100 →							
Canada	1	150	20	50	100	230	30	60	100	80
Cackling										
Brant										
White-fronted										
Snow										
Blue										
Other Total	1	150	20	50	100	230	30	60	100	80
Ducks:										
Mallard	4,400	4,420	5,400	6,500	11,370	8,500	4,700	4,500	6,210	4,000
Black										
Gadwall	5	10	10	10	10	15	50	50	45	45
Baldpate	15	15	15	20	25	25	40	60	35	25
Pintail	35	35	40	60	50	50	70	150	200	200
Green-winged teal	5	20	20	20	20	20	20	20	20	20
Blue-winged teal										
Cinnamon teal										
Shoveler	1									
Wood										5
Redhead										
Ring-necked	1	1	1	1	4	4	4	6	6	5
Canvasback										
Scaup		1	4	4	4	4	4	4	1	
Goldeneye	6	6	10	10	5	10	45	80	130	150
Bufflehead					10	10	10	10	10	10
Ruddy		2	2	2	2					
Other Total	4,450	4,500	5,502	6,607	11,500	8,830	4,943	4,880	6,447	4,530
Hooded merganser	2	2	5	5	5	10	10	10	10	15
Common merganser						5	5	10	10	10
Coot:	10	10	10	10	10	10	10	10	10	10

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE HAVASU MONTHS OF JANUARY TO MAY, 19 20

(1) Species	(2) Weeks of reporting period: 3/15-21 11	3/22-28 12	3/29-4/4 13	4/5-11 14	4/12-18 15	4/19-25 16	4/26-5/2 17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling	80	75	17	17	2	1	1		1,403		
Trumpeter											
Geese:											
Canada	70	50	45	45	45	45	25		8,582		
Cackling											
Brant											
White-fronted											
Snow		7	400	150	80	25	21		4,781		
Blue Rose's							1		7		
Other Total	70	57	445	195	125	70	77		13,370		
Ducks:											
Mallard	1,500	1,500	920	640	450	300	250		450,360		
Black											
Gadwall	40	50	25	25	30	65	40		3,605		
Baldpate	200	1,500	1,195	750	550	400	320		37,450		
Pintail	270	4,500	240	20	20	55	55		43,190		
Green-winged teal	80	30	30	45	60	125	150		4,515		
Blue-winged teal				2					14		
Cinnamon teal		2			15	35	75		889		
Shoveler	1	25	35	35	125	200	200		4,354		
Wood	20	40	60	60	40	50	75		2,170		
Redhead		1	15	15	15	25	35		782		
Ring-necked	5	15	80	80	80	85	85		2,581		
Canvasback		12	25	25	25	25	15		889		
Scaup		5	15	15	50	120	120		2,457		
Goldeneye	175	170	170	115	70	45	45		6,655		
Bufflehead	10	40	20	20	25	25	25		1,575		
Ruddy				1	15	45	45		708		
Other Total	2,230	7,000	2,770	1,850	1,620	1,600	1,505		574,208		
Hooded merganser	15	35	30	30	30	30	30		2,088		
Common merganser	25	40	50	50	40	20	20		1,925		
Coot:	10	25	55	730	1,000	1,700	1,900		38,640		
									38,640		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	3,483	200	
*Geese	13,370	230	
Ducks	572,208	11,980	
Coots	38,640	1,900	

SUMMARY

Principal feeding areas Winter--Pool 8, feeding on tract 21, 19 and 20 grain; migration use heaviest on Pools 2 and 5, good on Pools 3, 4 and 10.

Principal nesting areas

Reported by Howard A. Lipke
Howard A. Lipke, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

(1)	(2)		(3)		(4)		(5)		(6)	
III. Doves and Pigeons:										
Mourning dove	2	4/1	30-40	Late Apr.	Still present				P	30-40
White-winged dove										
Bald eagle	1	1/6	2	2/3 & 3/5	2	Early March			P	4-6
IV. Predaceous Birds: Osprey	2	4/18	2	Late Apr.	2 (nest pool 10)				P	2
Golden eagle										
Barn owl	Few from last period				Few still present					
Duck hawk										
Horned owl	8-10 (resident)		20-22	March-on	Still present			12	P	20-22
Magpie	From last period		100-150	April	50-75 still present				P	100-150
Raven	5	1/6	Several	Jan.-Feb.	Few still present				P	15-20
Crow	Several	March	Several	March	Few still present				P	50-75
Marsh hawk	1	3/2	Few	April	Few still present				P	5-10
Rough-legged hawk	Few from last period-sighted in Valley area in January								P	3-5
Red-tailed hawk	3	3/4	Few--early March		3-5 still present				P	5-10
Sparrow hawk	4	4/23	Several-late April		Still present				P	15-20
Pigeon hawk	1	4/20	Few--late April		1	4/20			P	1 or 2
Cooper's hawk	No refuge sighting--sighted in Valley area in January								P	1 or 2
Turkey vulture	4	4/22	4	4/22	4	4/22			P	5-10

Reported by Howard A. Lipke

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR--PORTLAND, OREGON

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Havalli Months of January to April 1946

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great blue heron	Few from last per.		Several	Mid April	Several still present					B 15-20
Horned grebe	9	4/23	Several	Late April	Still present					B 30-40
Common loon	1	4/28	1	4/28	1	5/1				B 1
II. Shorebirds, Gulls and Terns:										
Killdeer	Few from last per.		Many	Late March	Many still present (1st significant migration 3/24)					B 75-100
Wilson's snipe	1	4/2	Many	Late April	"	"	"			B 150-200
Greater yellowlegs	5	4/13	Several	Mid April	Few still present					B 20-30
Avocet	9	4/19	55	4/22	Few still present					B 80-100
Marbled godwit	3	4/23	55	4/25	"	"	"			B 80-100
Willet	1	4/23	Few	Late April	"	"	"			B 5-10
Sooty tern	Mid April		Several	"	Several still present					B 20-30
Ring billed gull	8	3/25	Few	Late April	Few still present					B 5-10*

(over)

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Havalli Months of January thru April, 1970

(1) * Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Brush, grass and agriculture-1000A.	25-33			1M/3F				D, 30-40	Population continues low, but good winter carry-over occurred. 5 known territorial roosters & several hens sighted. Some dispersion off the refuge suspected.
Hungarian (Grey) partridge	Grass and agriculture -- 600 acres								D, 10-15	No sightings during the period. Use periodic & short term by birds from foothills east of refuge.
Ruffed Grouse	Brush & timber of riverbottom-300 A.	--							D, 2-5	First recorded observation of this species. Three sightings made in tract 27. Mgt. should retain remnant population.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Havalli Year ending April 30, 1970

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Popula-tion
Mink	Marsh,streams-1000 A.													30-40
Muskrat	" " "													100-150
Beaver	" " - 500 A.													6 t
River Otter	River,streams- 200 A.													1-5(transien
Raccoon	Timber,marsh- 1000 A.													10-15
Striped skunk	Grass-cropland, brush-1500 A.				15									25-30
Red fox	Grass/cropland,brush-1500 A.				15									30
Bobcat	Timber - 800 A.													1 (transient)
Yellow-bellied marmot	Grass/cropland-1000 A.				5									15-20
Red squirrel	Timber - 800 A.													50-75
Columbian ground squirrel	Grass/cropland-1000 A.													400-500
Badger	Grass/cropland-1000 A.													5-10
Porcupine	Timber - 800 A.				2									5

* List removals by Predator Animal Hunter

REMARKS: General observation--no surveys conducted for population estimates (Data Class-B).
River otter and bobcat are transient. A bobcat was heard one night during the fall, and sign of three otter was noted on tract 27 during the winter of 1969.
Predator control of red fox included 9 that were trapped off SE refuge boundary (Hagens) during the winter. Estimated fox population includes young of the year.

Howard A. Lipke

Reported by Howard A. Lipke, Refuge Manager

INSTRUCTIONS

Form NR-4 - SMALL MAMMALS (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

INTERIOR--PORTLAND, OREGON

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE HAVALLI MONTHS OF MAY TO AUGUST, 1970

(2) - DATA CLASS C

(1) Species	Weeks of reporting period: 5/3-9 1*	5/10-16 2*	5/17-23 3*	5/24-30 4*	5/31-6/6 5*	6/7-13 6*	6/14-20 7*	6/21-27 8*	6/28-7/4 9*	7/5-11 10*
Swans:										
Whistling				1	1	1	1	1	1	1
Trumpeter										
Geese:										
Canada	75	75	75	55	55	55	55	55	60	65
Cackling										
Brant										
White-fronted	1									
Snow	2	1								
Blue										
Other TOTAL	78	76	75	55	55	55	55	55	60	65
Ducks:										
Mallard	150	140	140	150	170	170	220	220	220	250
Black										
Gadwall	35	30	25	25	25	25	25	35	35	35
Baldpate	150	50	20	20	20	20	20	40	40	40
Pintail	30	5	5	5	5	5	5	15	25	25
Green-winged teal	145	120	35	35	35	35	35	45	45	45
Blue-winged teal	40	90	110	125	125	125	125	130	150	200
Cinnamon teal	90	130	130	140	140	140	140	150	180	220
Shoveler	35	20	5	5	5	5	15	25	25	25
Wood	55	55	55	55	75	85	115	135	175	175
Redhead	75	65	65	65	65	65	65	65	85	105
Ring-necked	60	45	35	35	35	35	35	35	45	55
Canvasback	5	2	2	2	2	2	1	1	1	1
Scaup	90	60	40	30	30	30	30	30	40	40
Goldeneye	10	5	5	5	5	5				
Bufflehead	10	5	5	5	5	5	5	5		
Ruddy	120	60	60	50	45	45	45	45	45	55
[illegible] TOTAL	1,100	882	737	752	787	797	881	976	1,111	1,261
Hooded Merganser	30	70	110	130	130	130	130	130	130	130
Gormon "	10	5	5	5	5	5	15	15	15	15
Red breasted	5	10	10	10	10	10	10	10	10	10
Coot:	1,000	700	250	200	240	260	310	330	350	400

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE RAVALLI MONTHS OF MAY TO AUGUST, 19 70

(1) Species	(2) - DATA CLASS C Weeks of reporting period: 7/12-18 11*	7/19-25 12*	7/26-8/1 13*	8/2-8 14*	8/9-15 15*	8/16-22 16*	8/23-29 17*	8/30-9/5 18*	(3) Estimated waterfowl days use	(4)-C Pairs Production: Broods seen	Estimated total
Swans:											
Whistling	1	1	1	1	1	1	1	1	105		
Trumpeter											
Geese:											
Canada	70	80	30	-	-	-	-	-	5,635	8	27
Cackling											
Brant											
White-fronted									7		
Snow									21		
Blue											
Other TOTAL	70	80	30	-	-	-	-	-	5,663	8	27
Ducks:											
Mallard	350	400	400	400	400	400	350	350	34,160	64	266
Black											
Gadwall	35	35	35	35	35	30	30	25	3,885	10	30
Baldpate	40	40	40	40	40	40	40	40	5,180	6	18
Pintail	25	25	35	40	350	400	650	450	14,700	2	12
Green-winged teal	45	45	45	45	45	45	60	80	6,895	12	39
Blue-winged teal	250	300	300	300	350	350	150	150	23,590	52	182
Cinnamon teal	260	310	310	310	320	320	150	150	25,060	62	217
Shoveler	25	25	25	25	25	25	25	25	2,555	2	14
Wood	175	175	175	175	175	150	110	110	15,575	20	117
Redhead	105	105	105	105	105	105	80	50	10,360	36	75
Ring-necked	55	55	55	55	55	45	40	40	5,705	12	10
Canvasback	1	1	1	1	1	1	1	1	189	1	
Scaup	40	40	40	40	40	30	30	20	4,900	10	10
Goldeneye									245	2	
Bufflehead									315		
Ruddy	65	90	110	120	120	120	120	120	10,045	25	82
Other TOTAL	1,471	1,646	1,676	1,691	2,061	2,061	1,836	1,611	163,359	316	1,072
Hooded Merganser	130	130	130	130	130	100	75	75	14,140	20	90
Common Merganser	15	15	15	15	15	15	15	15	1,505	2	8
Red Breasted	10	10	10	10	10	10	10	10	1,225	2	-
Coot:	400	450	450	550	600	600	600	600	59,710	64	420

(over)

	(5) Total Days Use	(6)-C Peak Number	(7)-C Total Production
Swans	105	1	--
*Geese	5,691	80	27
Ducks*	163,359	2,061	1,072
Coots	59,710	1,000	420

*Excludes Mergansers

SUMMARY

Principal feeding areas Pool 2 early in period. Pool 6, then 5 and 10 late in period.

Principal nesting areas All major pools. Pool 6—major duck brood area. Pool 10 main goose area.

Reported by Howard A. Lipke
Howard A. Lipke, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

(1)	(2)		(3)		(4)		(5)		(6)
III. Doves and Pigeons:									
Mourning dove	From last period		200	Mid Aug.	Many still present				
White-winged dove									
IV. Predaceous Birds:									
Golden eagle									
~~Duck~~ Hawk Short-eared owl/	From last period				Few still present				
Horned owl	" " "		20-22 (Resident)		Still present			12	
Magpie	" " "		100-150	June	Many still present				
Raven	" " "		(Occasional few thru period)						
Crow					Few still present				
Marsh hawk	From last period		Few	Early May	" " "		(Return to refuge 8/7 after no su.obs.)		
Rough-legged hawk			"	Aug.					
Red-tailed hawk	From last period				4-6 still present		1	2	
Sparrow hawk	" " "				Several " "				
Sharp-shinned hawk	1	8/28	1 or 2	Late Aug.	1	8/28			
Osprey	2 from last period		4	7/14 on			1	2	D 6
Turkey vulture	5	6/16	5	Mid June	5	Mid June		0	

Reported by Howard A. Lipsc

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR--PORTLAND, OREGON

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Ravalli Months of May to August 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great blue heron	From last period		40-50	8/14-31	25-30 still present				0	
Horned grebe	From last period		170-190	5/8	Few still present				-	(156—5/8 count
Pied billed grebe	1	5/4	90-100	August	Still present				50-60	
Red necked grebe	1	5/15	3	5/21	3	5/21				D 3-5
Bittern	1	5/16	Few	Late May	1 heard	6/2				
II. Shorebirds, Gulls and Terns:										
Killdeer	From last period				Several still present					
Wilson's snipe	" "	"			"	" "				
Greater yellowlegs	" "	"			1	7/20				
Dowitcher	2	5/16	Few	Mid May	6	5/20			0	
Avocet	From last period		Several	Early May	13	5/8			0	
Wilson's phalarope		5/5	200	5/18	15	8/5			0	
Sora rail	From last period		Many	Late May	Several still present					
Sandpipers:	Several	5/8								
Spotted	"	6/8								
Black tern	1	5/8	25	6/8	Few	Mid June			0	
Forster's tern	1	5/8	Few		1	6/8			0	
White Pelican	4	5/23	None on refuge—migrated south over refuge.						0	

(over)

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge **Ravalli** For 12-month period ending August 31, 19 70

Reported by **Howard A. Lipke** Title **Refuge Manager**

(1) Area or Unit Designation	(2) Habitat Type	Acreage		(3) Use-days	(4) Prs. Breeding Population	(5) Production
	Crops	295	Ducks	1,081,500	316	1,072
	Upland	1,525	Geese	31,542	8	27
	Marsh	450	Swans	3,945	-	-
	Water	400	Coots	192,572	84	420
	Total	2,670	Total	1,309,559	408	1,519
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) Area or Unit: A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) Habitat: Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) Use-days: Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) Breeding Population: An estimate of the total breeding population of each category of birds for each area or unit.

(5) Production: Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Ravalli Months of May to September, 19 70

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Brush, grass and agriculture-1000A.		4	65					D, 80-90	Only 4 brood observations, however, heavy cover probably concealed most of production. Population considered low for available habitat.
Hungarian (Grey) partridge	Grass & agriculture 600 acres		-	0					D -	No observations during the period. Use generally limited to winter period when birds forced out of foothills.
Ruffed grouse	Brush & timber of riverbottom-- 300 A. Principle range in tract 27.		2	14					D, 15-20	Production realized from remnant population. Two brood observations made during period: 3+ in Tr. 27, 8 in east tract 25.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE RAVALLI MONTHS OF September TO December, 1970

(1) Species	(2) Weeks of reporting period: 1 (9/6-12)	2 (9/13-19)	3 (9/20-26)	4 (9/27-10/3)	5 (10/4-10)	6 (10/11-17)	7 (10/18-24)	8 (10/25-31)	9 (11/1-7)	10 (11/8-14)
Swans:										
Whistling				1	1			1	1	1
Trumpeter										
Geese:										
Canada	1	50	45	45	60	100	160	160	170	210
Cackling										
Brant										
White-fronted										
Snow										
Blue										
~~Other~~ Ross'										1
Ducks: TOTALS	1	50	45	45	60	100	160	160	170	211
Mallard	520	650	770	750	950	1100	1285	1450	1680	1450
Black										
Gadwall	20	20	15	25	50	130	145	145	155	95
Baldpate	250	650	1035	1050	1100	1350	2095	1800	645	590
Pintail	150	150	130	130	180	180	180	150	85	190
Green-winged teal	80	80	80	80	250	350	365	275	170	215
Blue-winged teal	80	80	60	60	30	15	10			
Cinnamon teal	80	70	60	60	30	15	10			
Shoveler	25	25	25	25	45	45	10	10		5
Wood	105	105	85	100	50	35		5	5	
Redhead	30	10	10	10	15	5	5	5	5	5
Ring-necked	40	50	60	60	55	40	15	10	10	10
Canvasback	1	1	1	1	25	10				5
Scaup	20	20	15	25	325	40	15	15	5	10
Goldeneye									10	10
Bufflehead			5	5	50	25	10	10		
Ruddy	100	80	45	45	1850	190	15	15	15	15
~~Other~~ TOTALS	1,501	1,991	2,396	2,426	5,005	3,530	4,160	3,890	2,785	2,600
Hooded merganser	50	45	30	30	100	60	30	20	20	50
Common merganser	15	15	15	15						
R.B. "	10	10	10	10						
Coot:	800	1100	1520	1400	1850	2500	3150	1700	520	330

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE RAVALLI MONTHS OF September TO December, 19 70

(1) Species	(2) Weeks of reporting period: 11 (11/15-21)	12 (11/22-28-11/29)	13 (12/6-12)	14 (12/13-19)	15 (12/20-26)	16 (12/27-1/2)	17	18	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling	1	1							35		
Trumpeter											
Geese:											
Canada	190	305	355	250	185	220	195		18,907		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
~~Other~~ Ross'	1								14		
Ducks: TOTALS	191	305	355	250	185	220	195		18,921		
Mallard	2380	5520	7090	7100	5040	4900	4620		330,785		
Black											
Gadwall	40	25	55	40	45	45	45		7,665		
Baldpate	370	155	115	55	75	60	50		80,115		
Pintail	50	100	80	80	75	70	60		14,280		
Green-winged teal	190	135	170	70	80	70	65		19,075		
Blue-winged teal									2,345		
Cinnamon teal									2,275		
Shoveler	5		5	5					1,610		
Wood									3,430		
Redhead									700		
Ring-necked	10	10							2,590		
Canvasback	5								343		
Scaup	15		5	5	5				3,640		
Goldeneye	5	20	10	20	20	20	10		875		
Bufflehead	5	5	5						840		
Ruddy	10	5	5	5	1				16,772		
~~Other~~ TOTALS	3085	5,975	7,540	7,380	5,341	5,165	4,850		487,340		
Hooded merganser	40	50	20	20	15	15	15		4,270		
Common merganser	5	15							560		
R.B.									280		
Coot:	200	40	30	30	15	15	10		106,470		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	35	1	--
Geese	18,921	355	--
Ducks*	487,340	7,540	--
Coots	106,470	3,150	--

*Excludes mergansers

SUMMARY

Principal feeding areas Pools 2, 5, 6 and 10 prior to freezing. After icing & hunting opening pools 6 and 10 received heavy use, with feeding on grain fields.

Principal nesting areas --

Reported by Howard A. Lipke
Howard A. Lipke, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove	From last period		Many -	Early Sept.	8	11/26		
White-winged dove								
IV. Predaceous Birds:								
~~Golden~~ eagle, Bald	1	11/14	2	12/17	1-2	Late Dec.		
~~Duck hawk~~ Pygmy owl	1	12/10	1	12/10	Few	" "		
Horned owl	From last period		15-20	resident	Still present			
Magpie	" " "		150-200	Oct.	30-50 present			
Raven	Several	9/24	Several	Late Nov.	Periodic appearances			
Crow	From last period		Periodic	use through period.				
Marsh hawk	From last period		6+	Late Nov.	1-3 still present			
Red-tailed hawk	" " "		Several	Sept.	2-4 " "			
Sparrow hawk	" " "		Many	Sept.				
Cooper's hawk	2	12/12	Few	Late Dec.	2	12/12		
Harlan's hawk	1	12/11	1 or 2	Late Dec.	1	12/18		
Osprey	From last period		1-3			Early Sept.		
Turkey vulture	3	9/4	3	Early Sept.	3	9/8		
Short-eared owl	From last period		6+	Mid-Nov. on	Still present			

Reported by Howard A. Lipke

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR--PORTLAND, OREGON

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Ravalli Months of September to December 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great blue heron	From last period		25-30	Early Sept.	5-10	Still present				
Horned grebe (&/or eared)	" " "		75-100	Early Oct.						
Pied billed grebe	From last period		50-75	Sept.	1-3	Still present				
Western grebe	15	10/9	15-20	Mid Oct.	1	10/20				
Sandhill crane	1	10/11-12	(Single yg. bird just east of refuge.)							
II. Shorebirds, Gulls and Terns:										
Killdeer	From last period		Many	Sept.	3	12/12				
Wilson's snipe	" " "		200-250	Late Sept.	1	12/17	(98 on Pool 8 - 9/24)			
Greater yellowlegs	" " "		Few	Sept.						
Sora rail	" " "		Several	"						
Virginia rail	1	12/18	Few	Dec.	Few still present					
Sandpipers	From last period									
California gull	1	9/24	2	10/9						

(over)

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURV

Refuge Ravalli

Year 1970

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/10-16	125	442	Mallard 100, Teal G.W. 31, Shoveler 19, Widgeon 19, Coots 14, Pintail 12, Gadwall 11, Ruddy 10, Teal B.W. 10, Ring-necked 9, Scaup 8, Unknown 8, Canvasback 6	257	39	296		
10/17-23	64	196	Mallard 23, G.W. Teal 8	52	13	65		
10/24-30	67	152	Mallard 18, Pintail 4, Ring-necked 4	41	17	58		
10/31-11/6	50	113	Mallard 24, Gadwall 5	40	12	52		
11/7-13	89	222	Mallard 16, Pintail 6	33	12	45		
11/14-20	55	149	Mallard 45, Canada geese 2	54	14	68		
11/21-27	107	330	Mallard 163, Pintail 6, Widgeon 6	189	25	214		
11/28-12/4	98	283	Mallard 92, Canada geese 5	108	12	120		
12/5-11	55	148	Mallard 56	60	9	69		
12/12-18	48	170	Mallard 69	69	2	71		
12/19-25	60	180	Mallard 68	71	1	72		
12/26-1/1	52	148	Mallard 35	39	1	40		
1/2-8 1/9-10	59	149	Mallard 43	64	2	66		
TOTALS	929	2682		1077	159 (15.2% minimum-duck only)	1236	1810	2475 (includes 20% crippling loss)

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURV

Refuge Ravalli

Year 1970

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
			Breakdown for 1076 ducks:					
				%				
			Mallard 757	70.4				
		52	G.W. Teal)					
		15	B.W. Teal) 67	6.2				
			Widgeon 48	4.5				
			Pintail 41	3.8				
			Shoveller 29					
			Gadwall 28		Other:			
			Ring-neck 16		Canada geese 9			
			Scaup 16		*Snow geese 4			
			Ruddy 15		Coot 18			
			Canvasback 9					
			Wood duck 2					
			Redhead 1					
			Unknown 47					
			*Ross' likely					

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Ravalli Months of September to December, 1970

(1) * Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Brush, grass and agriculture-1000 A.				1M/4F	15			D,100-120	State release of 50 hens supplemented wild population. Birds well distributed with noticeable good use made of south tract 27. Hunters had difficulty locating birds in hunting area.
Hungarian (Gray) partridge	Grass & agriculture 600 acres								D, 5-10	First 1970 observations made. Two sightings were made in west tract 25--flock of 7 on 11/14, pair on 11/29. Refuge use seasonal.
Ruffed grouse	Brush & timber of riverbottom-- 300 A. Principle range in tract 27.								D, 15-20	No new observations daring period but remnant population maintaining itself in tract 27.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Ravalli Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed deer	Brush, timber, grass & agriculture (1700 acres)	10					1	road kill				35	25	1M/2F

Remarks: Four sets of twin fawns.
No known kills were reported for the approximately 50 archery deer hunter visits recorded. Some harvest of Refuge herd probably occurs in gun zone bordering NE boundary of the refuge.
Single day observation--20 different deer, 3/28/70.

Reported by Howard A. Lipke
Howard A. Lipke

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each</u> <u>species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1755
Form NR-5
60701

DISEASE

Refuge Ravalli Year 1970

Botulism

Period of outbreak NONE

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life _____

Remarks _____

Lead Poisoning or other Disease

Kind of disease NONE

Species affected _____

Number Affected Species	Actual Count	Estimated

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks _____

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Refuge Ravalli Year 19 70

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs) Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Plantings (Marsh - Aquatic - Upland) Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Bulrush	75 rootstocks	C	7/9-10	Refuge	$40	75	Pools, 2,3,5	1/A.	75 A.	75 stocks	7/9-10	Unknown(1	--
Millett, Japanese	100 lbs	R	1970	Calif.	$28	100#	Pool 2A & Tr. 13 pond.	20#/A.	5 A.	100#	6/8 & - 11	5% produce seed	Horses, poor seed bed
Timothy, Ladino & Wh. Dutch clovers.		R	1969-70	Mont.		See NR-8A	Tract 27	10#/A.	.5 A.	5#	11/9	Unknown(2	--
PLUS: Nordan crested & intermediate wheatgrasses.	200#	R	1970	Mont.	$83	See NR-8A	Refuge-dikes, waste areas, islands.	20#/A (mix)	8 A.	160#	Oct.- Nov.	Unknown(3	--

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic 80
Hedgerows, cover patches 8
Food strips, food patches
Forest plantings .5

Remarks: (1 Survival of bulrush transplants to be determined after 1971 growing season.
(2 Fall seeded--survival to be determined in 1971. (Browse/cover)
(3 Fall seeded--survival to be determined in 1971. (Cover/erosion contro
Plantings of Russian olive, Honeysuckle & Caragana in 1966 show 75-80% survival. Vigor maintained by cultivation and watering.

INTERIOR--PORTLAND, OREGON

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Ravalli County Ravalli State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Barley	72	4,510 bu.	1.5	90 bu.	32.5	2,050 bu.	106	Fall planted winter wheat on fallow acres (browse in fall & spring, but will produce grain in 1971).	65
Wheat (Gaines winter)	42	3,360 bu.	1	60 bu.	20	1,600 bu.	63		
Corn (Hybrid yellow)					1	50 bu.	1	Gaines winter wheat	2
Totals	114	7,870 bu.	2.5	150 bu.	53.5	3,700 bu.	170	Ladino clover/ timothy/white dutch clover.	1
								Fallow Ag. Land	87

No. of Permittees: Agricultural Operations 2 Haying Operations 1 Grazing Operations 4

1 apiary - 60 hives @.25 -- $15.00

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Alfalfa	104.32	37	$625.92	1. Cattle	75*	370.67	$1,112.01	520
				2. Other** horses-mules	26	100	181.50	180
				1. Total Refuge Acreage Under Cultivation				296
Hay - Wild				2. Acreage Cultivated as Service Operation				3

*Does not include calves.
**Includes up to 14 head of horses & mules owned by Forest Service--free use permit (intermittent use).

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.-DUP. SEC., WASH., D.C.91767

3-1570
NR-8a

REFUGE GRAIN REPORT*

Refuge Ravalli Months of January through December, 1970

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Barley	690	90	780			)		-	-	-	-
Wheat, winter	180	60	240			) 620	620	500		500	
Corn (Hybrid yellow)		.5	.5		.25		.25	.25 (13#)	.25		
Japanese Millet		3	3		3		3	0			
Timothy	31		31		5		5	26	26		
White Dutch clover	8		8		3		3	5	5		
Ladino clover		.33	.33		.05		.05	.28 (17#)	.28		
Alsike clover		.33	.33				0	.33 (20#)	.33		
Crested wheatgrass (Nordan)		7	7		3		3	4 (90#)	4		
Intermediate wht.gr.		2	2		.5		.5	1.5(40#)	1.5		

(8) Indicate shipping or collection points Northern Pacific R.R. depot, Stevensville

(9) Grain is stored at Headquarters granaries--work center and Q-2 area.

(10) Remarks Barley/wheat used for banding and emergency winter feeding. *This form also serves as refuge inventory for other seed.

*See instructions on back.

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

INT.-DUP. SEC., WASH., D.C. 59323

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge Ravalli Year 1970

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
NONE*								

Total acreage cut over.....

No. of units removed B. F.....
Cords.....
Ties.....
.....

Total income.....

Method of slash disposal.....

*40,000 board feet of Ponderosa Pine timber scaled in tract 27 in November. Salvage cut in basin of Pool 12 to be reported in 1971.

INT.-DUP. SEC., WASH., D.C. 36103

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge **Ravalli**

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number

Reporting Year **1970**

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) May 18-20	Broadleaf annuals Mustard Canada thistle Scotch "	Agricultural lands fields A21-1 thru 21-8, All land 2, and A 19-1.	170	2,4-D, PGBEE	43 lbs. ae (11 gal.@4#ae)	.25 lbs./A	Water 10 gal/A.	Tractor/ broadjet
(2) June 18-19	Thistles Canada Scotch Knapweed	Dikes & roads, disturbed plots & waste ag. land (10 sites)	45	2,4-D, DMS	48 lbs. ae (12 gal.@4#ae)	1.06 lbs./A.	Water 10 gal/A.	County spray-truck, hand nozzle & boom.
(3) June 11-12	"	Tract 19 pasture-grasing unit G-19	56	2,4-D, DMS	56 lbs. ae (14 gal.@4#ae)	1 lb./A.	"	"

10. Summary of results (continue on reverse side, if necessary)

(1) Because of the spread in dates of application some variation occurred in spraying conditions. Control on prime target species (mustard) estimated at 80-90%, and competition from more hardy species (thistle) was reduced. Effects varied with units with control least successful on later sprayed units, particularly A 19-1.

(2) Estimate 65-70% kill with most of remaining thistle plants weakened (no seed production). Spray areas which have received repeated treatment converting to grass cover. South refuge dike infestations showed best results.

(3) Grassland pasture sprayed at expense of Forest Service. Control of weeds on unit 80% effective due to repeated spraying but kill on knapweed less than that of thistle. Last year of spraying, but competition of grasses on majority of unit should hold down noxious weeds in the future.

INTERIOR--PORTLAND, OREGON

Howard A. Lipke, Refuge Manager

Ellen H. Anderson, Clerk

Thomas B. Davies, Mtc'man Ldr.

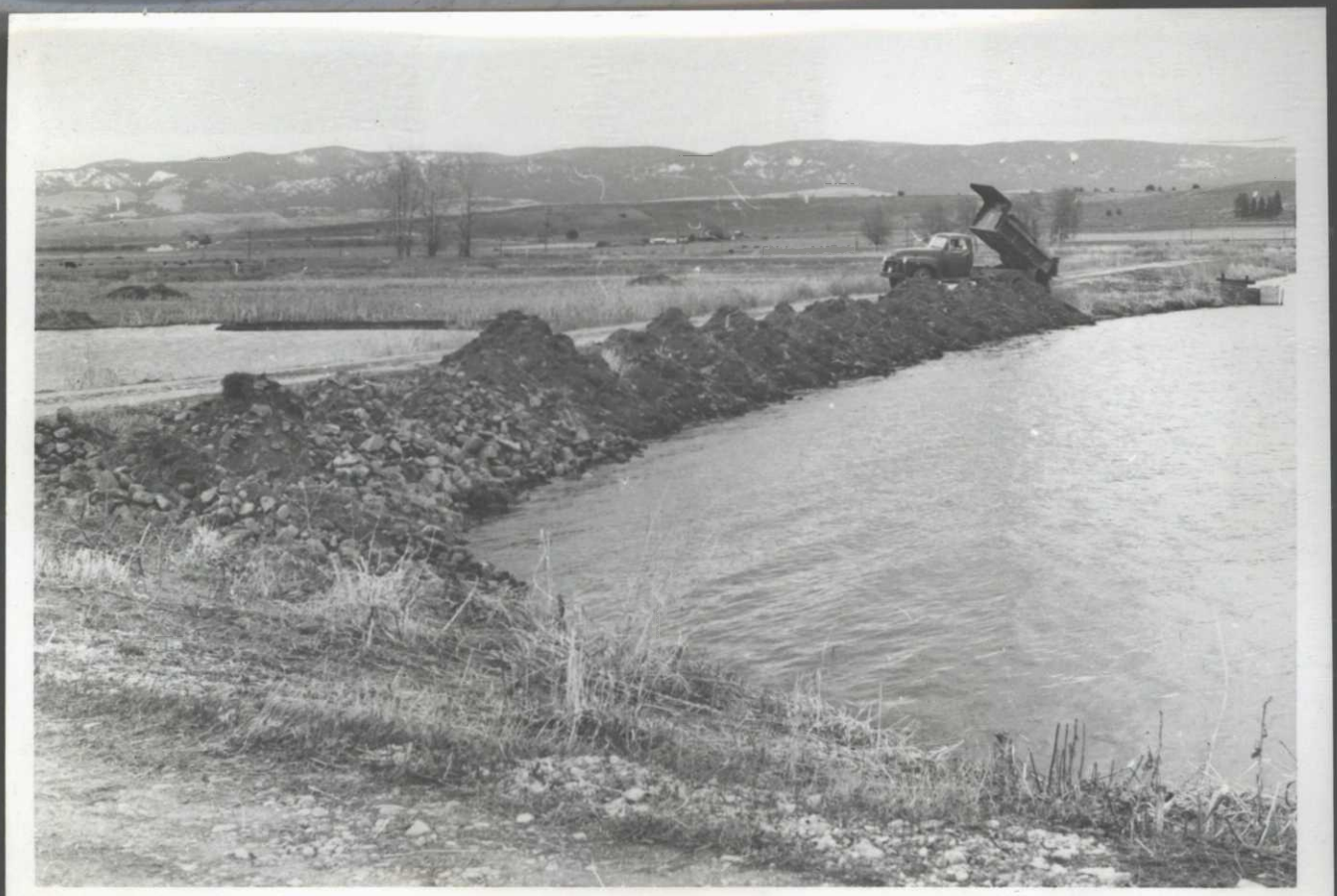
Otto Wolf, Maintenanceman

Flooding of major pools, 8 and 10, bolsters refuge marsh acreage. Pool 10 is refuge's largest, and Pool 8 is principle refuge wintering unit. Flath photo.

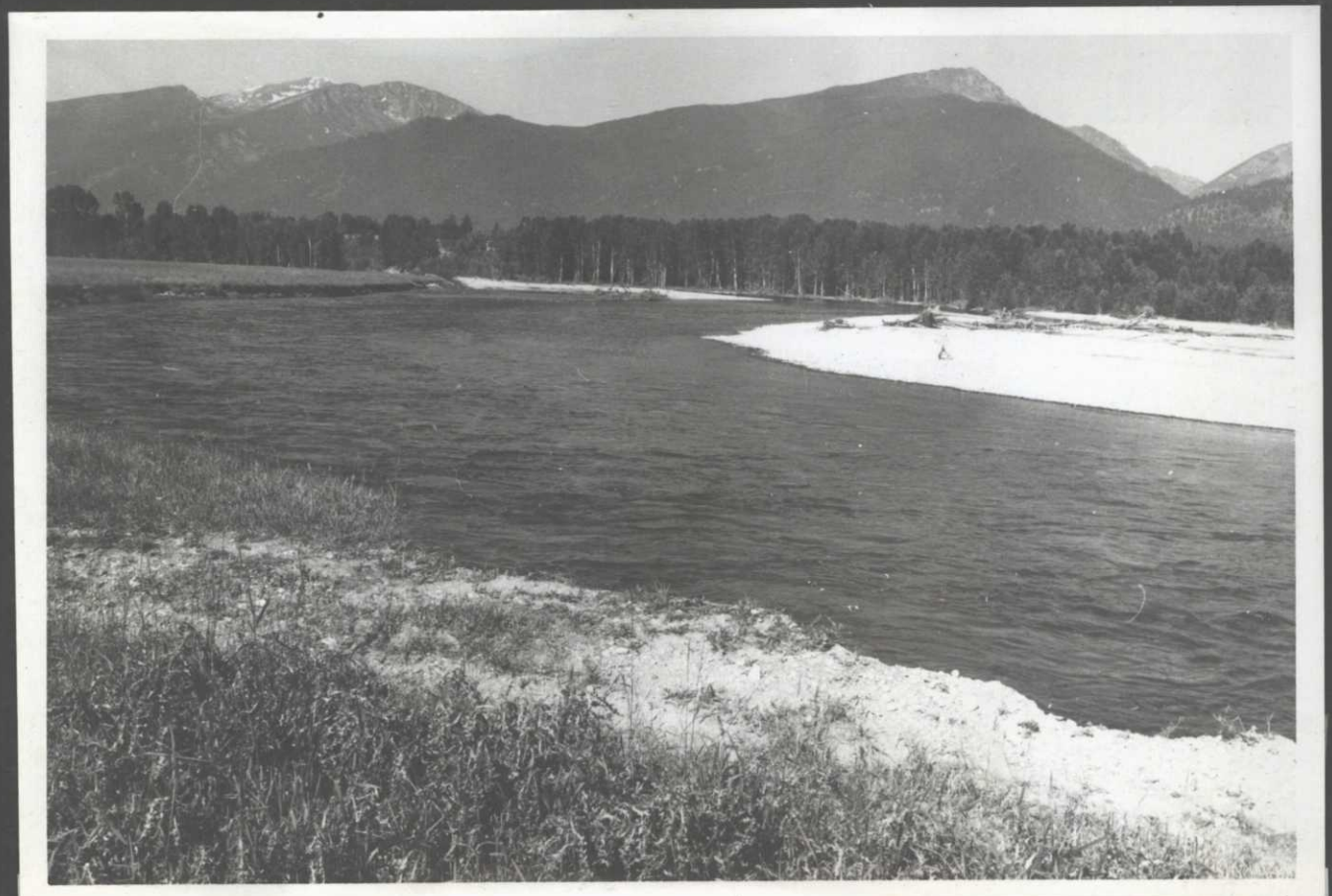
National Wildlife Week activity included this local window display and 13 wildlife slide-talks to 1,870 Bitterroot Valley students. R-1, E-34, Lipke.

Growing refuge and Valley goose flock warrants closer study of population. Initial banding netted 15 geese which should give insight into mgt. R-5, E-2, Lipke.

70 acres of grassland fertilized for cover improvement. Additional grazing deferment (G-25) will speed rehabilitation of soil and vegetation. R-2, E-6, Lipke.



Lack of emergent cover and wind and wave erosion on south dike segments of pools 1-3 necessitated riprapping on about 1200 feet for protection. R-2, E-14, Lipke.



Bitterroot R. in NW Tr. 12 is causing serious erosion threats. Since 1964 bank has moved 415', deepest cut in 1970 being 106' when 1½ A. were lost. R-6, E-17, Lipke

Refuge potential for wood duck production is great. River oxbows and small timbered impoundments are attracting increasing number of pairs. R-1, E-16, Lipke.

Thirty-seven wood duck boxes supplement natural cavities. In second year 14 had activity and 11 (29.7%) hatched wood ducks or mergansers. R-1, E-6, Lipke.

Bitterroot Valley Canada geese are unique, nesting in tops of broken snags and tree-top osprey and hawk nests. About 28 pairs nesting in valley. Flath.

Four refuge tree-top artificial platforms were used by geese this spring. Wash-tub nest was one of five successful refuge nests raising 27 young. Flath.

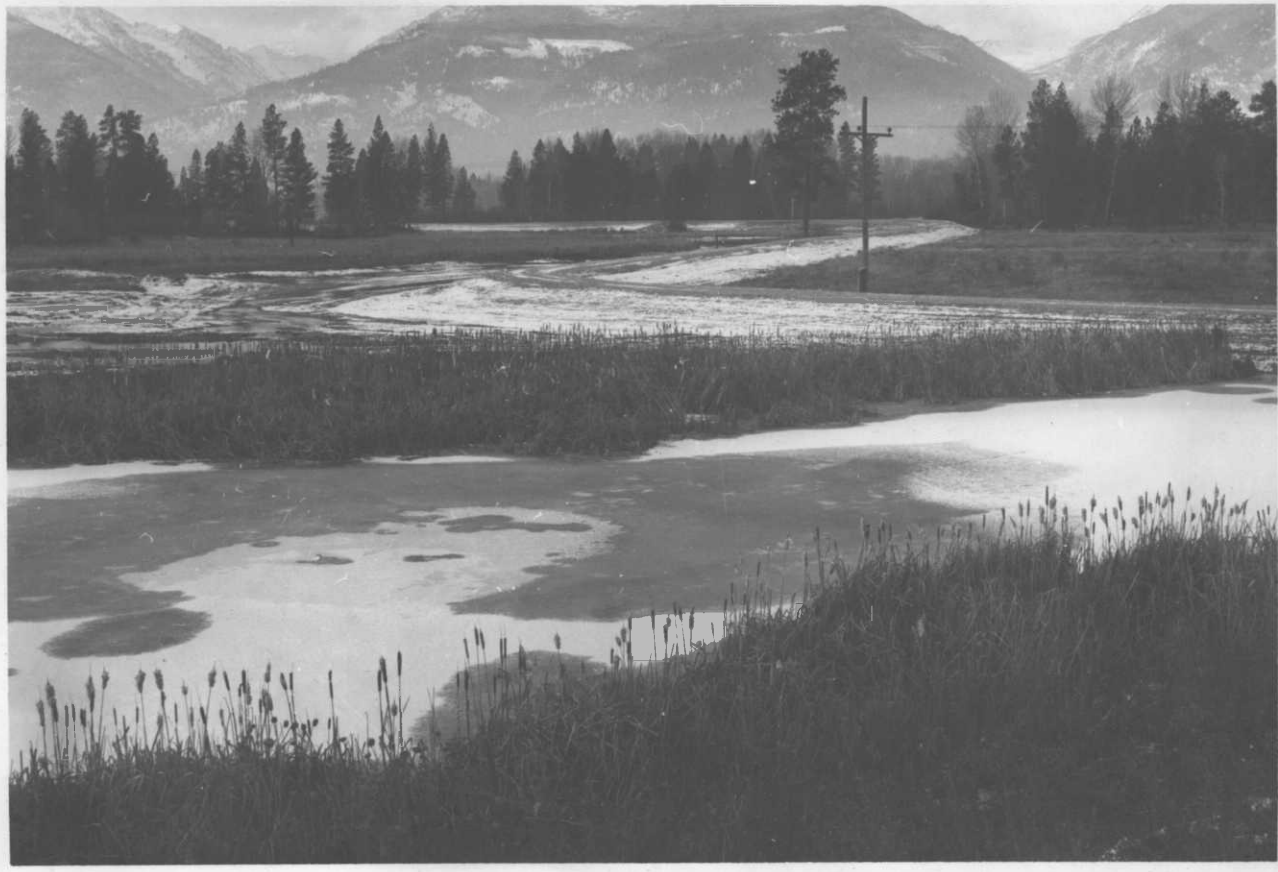
Controlled burning was undertaken on 42 acres for habitat improvement & weed control. Additional burning (125 A.) done to facilitate farming. R-2, E-10, Lipke.

Burning on grassland was experimental but a 35 acre burn on tract 27 brush/timber unit provided excellent growth of resprouting deer browse. R-8, E-11, Lipke.

Noxious weed control undertaken on 108 acres, 100 of which were sprayed with 2, 4-D. Mowing & burning were also used on thistle and knapweed. R-6, E-6, Lipke.

Stevensville Creamery Picnic is an annual festive community activity. Float (3d place) was intended to strengthen refuge/community ties. R-7, E-19, Lipke.

Contract hauling of 2500 yds of fill to raise and widen Pool 8 dike was complete
Pool is principle unit for wintering mallards. R-5, E-13, Lipke.



Tract 27 dike improvement (Pool 12) will provide 50-55 acres of key waterfowl habitat providing maximum shoreline per acre of marsh. R-10, E-6, Lipke.

Total of 31 potholes were dug by dragline and dozer in seepage areas and sedge flats. Goal--increase duck production above 1970 total of 1170. R-3,E-20A,Lipke.

Eight water-spreading/duck production ponds were established by diking benchland draws. Water will improve cover and increase production. R-3, E-13, Lipke.

Educational use of refuge being encouraged and local schools and University using area for field study. Fish samples to be tested for pesticides. R-9,E-7,Lipke.

Peak number of 7,540 ducks mainly used Pool 10 along with Unit 8 during hunting season. Annual use nearing 1.5 million refuge use-day goal. R-11, E-3, Lipke.

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE RAVALLI MONTHS OF JANUARY TO MAY, 1970

(1) Species	(2) Weeks of reporting period: 1/4-10 (1)	1/11-17 (2)	1/18-24 (3)	1/25-31 (4)	2/1-7 (5)	2/8-14 (6)	2/15-21 (7)	2/22-28 (8)	3/1-7 (9)	3/8-14 (10)
Swans:										
Whistling								5	200	95
Trumpeter										
Geese:			← 20 to 100		→					
Canada	1	180	20	50	100	230	30	80	100	80
Cackling										
Brant										
White-fronted										
Snow										
Blue										
~~Other~~ Total	1	180	20	50	100	230	30	80	100	80
Ducks:										
Mallard	4,400	4,410	5,400	6,500	11,370	8,500	4,700	4,500	6,140	4,000
Black										
Gadwall	5	10	10	10	10	15	50	50	45	45
Baldpate	15	15	15	20	25	25	60	60	75	75
Pintail	35	35	40	40	50	50	70	150	200	200
Green-winged teal	5	20	20	20	20	20	20	20	20	20
Blue-winged teal										
Cinnamon teal										
Shoveler	1									
Wood										5
Redhead										
Ring-necked	1	1	1	1	4	4	4	6	6	5
Canvasback										
Scaup		1	4	4	4	4	4	4	1	
Goldeneye	6	6	10	10	5	10	45	80	130	130
Bufflehead					10	10	10	10	10	10
Ruddy		2	2	2	2					
~~Other~~ Total	4,460	4,500	5,502	6,607	11,500	8,638	4,943	4,800	6,647	4,530
Hooded merganser	2	2	5	5	5	10	10	10	10	15
Common merganser						5	5	10	10	10
Coot:	10	10	10	10	10	10	10	10	10	10

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE RAVALLI MONTHS OF JANUARY TO MAY, 19 70

(1) Species	(2) Weeks of reporting period: 3/15-21 (11)	3/22-28 (12)	3/29-4/4 (13)	4/5-11 (14)	4/12-18 (15)	4/19-25 (16)	4/26-5/2 (17)	(18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling	80	75	17	17	2	1	1		3,493		
Trumpeter											
Geese:											
Canada	70	50	45	45	45	45	55		8,582		
Cackling											
Brant											
White-fronted											
Snow		7	400	150	80	25	21		4,781		
Blue							1		7		
Ross'											
Other											
Total	70	57	445	195	125	70	77		13,370		
Ducks:											
Mallard	1,500	1,500	920	640	450	300	250		458,360		
Black											
Gadwall	40	40	25	25	30	65	40		3,605		
Baldpate	200	1,500	1,195	750	550	400	300		37,450		
Pintail	270	4,500	240	90	90	55	55		43,190		
Green-winged teal	20	30	30	45	60	125	150		4,515		
Blue-winged teal				2					14		
Cinnamon teal		2			15	35	75		889		
Shoveler	1	25	35	35	125	200	200		4,354		
Wood	20	40	40	40	40	50	75		2,170		
Redhead		1	15	15	15	25	35		742		
Ring-necked	5	15	40	40	60	85	85		2,511		
Canvasback		12	25	25	25	25	15		869		
Scaup		5	15	15	50	120	120		2,457		
Goldeneye	170	170	170	115	70	45	45		8,659		
Bufflehead	10	40	20	20	25	25	25		1,575		
Ruddy				1	15	45	45		798		
Other											
Total	2,236	7,800	2,770	1,850	1,620	1,600	1,565		572,200		
Hooded merganser	15	25	30	30	30	30	30		1,848		
Common merganser	25	40	90	50	40	20	20		1,995		
Coot:	10	25	55	730	1,000	1,700	1,300		30,640		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	3,483	200	
*Geese	13,370	230	
Ducks	572,208	11,500	
Coots	38,640	1,900	

SUMMARY

Principal feeding areas Winter--Pool 8, feeding on tract 21, 19 and 20 grain; migration use heaviest on Pools 2 and 5, good on Pools 3, 4 and 10.

Principal nesting areas

Reported by Howard A. Lipke
Howard A. Lipke, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

(1)	(2)		(3)		(4)		(5)	(6)	
III. Doves and Pigeons:									
Mourning dove	2	4/7	30-40	Late Apr.	Still present			D	30-40
White-winged dove									
Bald eagle	1	1/6	2	2/3 & 3/5	2	Early March		D	4-6
IV. Predaceous Birds: Osprey	2	4/18	2	Late Apr.	2 (nest pool 10)			D	2
Golden eagle									
Short-eared owl	Few from last period				Few still present				
Duck hawk									
Horned owl	8-10 (resident)		20-22	March-on	Still present		12	D	20-22
Magpie	From last period		100-150	April	50-75 still present			D	100-150
Raven	5	1/6	Several	Jan.-Feb.	Few still present			D	15-20
Crow	Several	March	Several	March	Few still present			D	50-75
Marsh hawk	1	3/2	Few	April	Few still present			D	5-10
Rough-legged hawk	Few from last period-sighted in Valley area in January							D	3-5
Red-tailed hawk	3	3/4	Few--early March		3-5 still present			D	5-10
Sparrow hawk	4	4/23	Several-late April		Still present			D	15-20
Pigeon hawk	1	4/20	Few--late April		1	4/20		D	1 or 2
Cooper's hawk	No refuge sighting--sighted in Valley area in January							D	1 or 2
Turkey vulture	4	4/22	4	4/22	4	4/22		D	5-10

Reported by Howard A. Lipke
Refuge Manager

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Ravalli Months of January thru ~~xx~~ April, 1970

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Brush, grass and agriculture-1000A.	25-33			1M/3F				D, 30-40	Population continues low, but good winter carry-over occurred. 5 known territorial roosters & several hens sighted. Some dispersion off the refuge suspected.
Hungarian (Gray) partridge	Grass and agriculture -- 600 acres	--							D, 10-15	No sightings during the period. Use periodic & short term by birds from foothills east of refuge.
Ruffed Grouse	Brush & timber of riverbottom-300 A.	--							D, 2-5	First recorded observation of this species. Three sightings made in tract 27. Mgt. should retain remnant population.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1754
Form NR-4
(June 1945)

SMALL MAMMALS

Refuge Ravalli Year ending April 30, 1970

(1) Species	(2) Density		(3) Removals					(4) Disposition of Furs						(5)
								Share Trapping						
Common Name	Cover Types & Total Acreage of Habitat	Acres Per Animal	Hunting	Fur Harvest	Predator * Control	For Re-stocking	For Re-search	Permit Number	Trappers Share	Refuge share	Total Refuge Furs Shipped	Furs Donated	Furs Destroyed	Total Popula-tion
Mink	Marsh,streams-1000 A.													~~30-40~~
Muskrat	" " "													100-150
Beaver	" " - 500 A.													6 t
River Otter	River,streams- 200 A.													1-5(transien
Raccoon	Timber,marsh- 1000 A.													10-15
Striped skunk	Grass-cropland, brush- 1500 A.				15									25-30
Red fox	Grass/cropland,brush- 1500 A.				15									30*
Bobcat	Timber - 800 A.													1 (trans-ient)
Yellow-bellied marmot	Grass/cropland-1000 A.				5									15-20
Red squirrel	Timber - 800 A.													50-75
Columbian ground squirrel	Grass/cropland-1000 A.													400-500
Badger	Grass/cropland-1000 A.													5-10
Porcupine	Timber - 800 A.				2									5

* List removals by Predator Animal Hunter

REMARKS: General observation--no surveys conducted for population estimates (Data Class-D).
River otter and bobcat are transient. A bobcat was heard one night during the fall, and sign of three otter was noted on tract 27 during the winter of 1969.

Predator control of red fox included 9 that were trapped off SE refuge boundary (Hagena) during the winter. Estimated fox population includes young of the year.

Reported by Howard A. Lipke
Howard A. Lipke, Refuge Manager

INSTRUCTIONS

Form NR-4 - **SMALL MAMMALS** (Include data on all species of importance in the management program; i. e., muskrats, beaver, coon, mink, coyote. Data on small rodents may be omitted except for estimated total population of each species considered in control operations.)

(1) SPECIES: Use correct common name. Example: Striped skunk, spotted skunk, short-tailed weasel, gray squirrel, fox squirrel, white-tailed jackrabbit, etc. (Accepted common names in current use are found in the "Field Book of North American Mammals" by H. E. Anthony and the "Manual of the Vertebrate Animals of the Northeastern United States" by David Starr Jordan.)

(2) DENSITY: Applies particularly to those species considered in removal programs. Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottom land hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) REMOVALS: Indicate the total number under each category removed since April 30 of the previous year, including any taken on the refuge by Service Predatory Animal Hunter. Also show any removals not falling under headingslisted.

(4) DISPOSITION OF FUR: On share-trapped furs list the permit number, trapper's share, and refuge share. Indicate the number of pelts shipped to market, including furs taken by Service personnel. Total number of pelts of each species destroyed because of unprimeness or damaged condition, and furs donated to institutions or other agencies should be shown in the column provided.

(5) TOTAL POPULATION: Estimated total population of each species reported on as of April 30.

REMARKS: Indicate inventory method(s) used, size of sample area(s), introductions, and any other pertinent information not specifically requested.

INTERIOR--PORTLAND, OREGON

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE RAVALLI MONTHS OF MAY TO AUGUST, 19 70

(2) - DATA CLASS C

(1) Species	Weeks of reporting period: 5/3-9 1*	5/10-16 2*	5/17-23 3*	5/24-30 4*	5/31-6/6 5*	6/7-13 6*	6/14-20 7*	6/21-27 8*	6/28-7/4 9*	7/5-11 10*
Swans:										
Whistling				1	1	1	1	1	1	1
Trumpeter										
Geese:										
Canada	75	75	75	55	55	55	55	55	60	65
Cackling										
Brant										
White-fronted	1									
Snow	2	1								
Blue										
Other TOTAL	78	76	75	55	55	55	55	55	60	65
Ducks:										
Mallard	150	140	140	150	170	170	220	220	220	250
Black										
Gadwall	35	30	25	25	25	25	25	35	35	35
Baldpate	150	50	20	20	20	20	20	40	40	40
Pintail	30	5	5	5	5	5	5	15	25	25
Green-winged teal	145	120	35	35	35	35	35	45	45	45
Blue-winged teal	40	90	110	125	125	125	125	130	150	200
Cinnamon teal	90	130	130	140	140	140	140	150	180	210
Shoveler	35	20	5	5	5	5	15	25	25	25
Wood	55	55	55	55	75	85	115	135	175	175
Redhead	75	65	65	65	65	65	65	65	85	105
Ring-necked	60	45	35	35	35	35	35	35	45	55
Canvasback	5	2	2	2	2	2	1	1	1	1
Scaup	90	60	40	30	30	30	30	30	40	40
Goldeneye	10	5	5	5	5	5				
Bufflehead	10	5	5	5	5	5	5	5		
Ruddy	120	60	60	50	45	45	45	45	45	55
Other TOTAL	1,100	882	737	752	787	797	881	976	1.111	1,261
Hooded Merganser	30	70	110	130	130	130	130	130	130	130
Common "	10	5	5	5	5	5	15	15	15	15
Red breasted	5	10	10	10	10	10	10	10	10	10
Coot:	1.000	700	250	200	240	260	310	330	350	400

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE RAVALLI MONTHS OF MAY TO AUGUST, 19 70

(1) Species	(2) - DATA CLASS C — Weeks of reporting period: 7/12-18 11*	7/19-25 12*	7/26-8/1 13*	8/2-8 14*	8/9-15 15*	8/16-22 16*	8/23-29 17*	8/30-9/5 18*	(3) Estimated waterfowl days use	(4)-C Pairs Production: Broods seen	Estimated total
Swans:											
Whistling	1	1	1	1	1	1	1	1	105		
Trumpeter											
Geese:											
Canada	70	80	30	-	-	-	-	-	5,635	8	27
Cackling											
Brant											
White-fronted									7		
Snow									21		
Blue											
Other TOTAL	70	80	30	-	-	-	-	-	5,663	8	27
Ducks:											
Mallard	350	400	400	400	400	400	350	350	34,160	64	266
Black											
Gadwall	35	35	35	35	35	30	30	25	3,885	10	30
Baldpate	40	40	40	40	40	40	40	40	5,180	6	18
Pintail	25	25	35	40	350	400	650	450	14,700	2	12
Green-winged teal	45	45	45	45	45	45	60	80	6,895	12	39
Blue-winged teal	250	300	300	300	350	350	150	150	23,590	52	182
Cinnamon teal	260	310	310	310	320	320	150	150	25,060	62	217
Shoveler	25	25	25	25	25	25	25	25	2,555	2	14
Wood	175	175	175	175	175	150	110	110	15,575	20	117
Redhead	105	105	105	105	105	105	80	50	10,360	36	75
Ring-necked	55	55	55	55	55	45	40	40	5,705	12	10
Canvasback	1	1	1	1	1	1	1	1	189	1	
Scaup	40	40	40	40	40	30	30	20	4,900	10	10
Goldeneye									245	2	
Bufflehead									315		
Ruddy	65	90	110	120	120	120	120	120	10,045	25	82
Other TOTAL	1,471	1,646	1,676	1,691	2,061	2,061	1,836	1,611	163,359	316	1,072
Hooded Merganser	130	130	130	130	130	100	75	75	14,140	20	90
Common Merganser	15	15	15	15	15	15	15	15	1,505	2	8
Red Breasted "	10	10	10	10	10	10	10	10	1,225	2	-
Coot:	400	450	450	550	600	680	680	680	59,710	84	420

(over)

	(5) Total Days Use	(6)-C Peak Number	(7)-C Total Production
Swans	105	1	--
*Geese	5,691	80	27
Ducks*	163,359	2,061	1,072
Coots	59,710	1,000	420

*Excludes Mergansers

SUMMARY

Principal feeding areas Pool 2 early in period. Pool 6, then 5 and 10 late in period.

Principal nesting areas All major pools. Pool 6--major duck brood area. Pool 10 main goose area.

Reported by Howard A. Lipke Howard A. Lipke, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

Refuge Ravalli Months of May to September, 19 70

(1) Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Brush, grass and agriculture-1000A.		4	65					D, 80-90	Only 4 brood observations, however, heavy cover probably concealed most of production. Population considered low for available habitat.
Hungarian (Gray) partridge	Grass & agriculture 600 acres		-	0					D -	No observations during the period. Use generally limited to winter period when birds forced out of foothills.
Ruffed grouse	Brush & timber of riverbottom-- 300 A. Principle range in tract 27.		2	14					D, 15-20	Production realized from remnant population. Two brood observations made during period: 3+ in Tr. 27, 8 in east tract 25.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce-swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Ravalli Months of May to August 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great blue heron	From last period		40-50	8/14-31	25-30 still present				0	
Horned grebe	From last period		170-190	5/8	Few still present				-	(156--5/8 count
Pied billed grebe	1	5/4	90-100	August	Still present				50-60	
Red necked grebe	1	5/15	3	5/21	3	5/21				D 3-5
Bittern	1	5/16	Few	Late May	1 heard	6/2				
II. Shorebirds, Gulls and Terns:										
Killdeer	From last period				Several still present					
Wilson's snipe	" "	"			"	" "				
Greater yellowlegs	" "	"			1	7/20				
Dowitcher	2	5/16	Few	Mid May	6	5/20			0	
Avocet	From last period		Several	Early May	13	5/8			0	
Wilson's phalarope		5/5	200	5/18	15	8/5			0	
Sora rail	From last period		Many	Late May	Several still present					
Sandpipers:	Several	5/8								
Spotted	"	6/8								
Black tern	1	5/8	25	6/8	Few	Mid June			0	
Forster's tern	1	5/8	Few		1	6/8			0	
White Pelican	4	5/23	None on refuge--migrated south over refuge.						0	

(over)

(1)	(2)		(3)		(4)		(5)		(6)
III. Doves and Pigeons:									
Mourning dove	From last period		200	Mid Aug.	Many still present				
White-winged dove									
IV. Predaceous Birds:									
Golden eagle									
~~Duck hawk~~ Short-eared owl	From last period				Few still present				
Horned owl	" "	"	20-22	(Resident)	Still present			12	
Magpie	" "	"	100-150	June	Many still present				
Raven	" "	"	(Occasional few thru period)						
Crow					Few still present				
Marsh hawk	From last period		Few	Early May	" "	"	(Return to refuge 8/7 after no su.obs.)		
Rough-legged hawk			"	Aug.					
Red-tailed hawk	From last period				4-6 still present		1	2	
Sparrow hawk	" "	"			Several "	"			
Sharp-shinned hawk	1	8/28	1 or 2	Late Aug.	1	8/28			
Osprey	2 from last period		4	7/14 on			1	2	D 6
Turkey vulture	5	6/16	5	Mid June	5	Mid June		0	

Reported by Howard A. Lipke

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1750b
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge Ravalli   For 12-month period ending August 31, 1970

Reported by Howard A. Lipke   Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat Type	Acreage	(3)	Use-days	(4) Prs. Breeding Population	(5) Production
	Crops	295	Ducks	1,081,500	316	1,072
	Upland	1,525	Geese	31,542	8	27
	Marsh	450	Swans	3,945	-	-
	Water	400	Coots	192,572	84	420
	Total	2,670	Total	1,309,559	408	1,519
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			
	Crops		Ducks			
	Upland		Geese			
	Marsh		Swans			
	Water		Coots			
	Total		Total			

(over)

INSTRUCTIONS

All tabulated information should be based on the best available techniques for obtaining these data. Estimates having no foundation in fact must be omitted. Refuge grand totals for all categories should be provided in the spaces below the last unit tabulation. Additional forms should be used if the number of units reported upon exceeds the capacity of one page. This report embraces the preceding 12-month period, NOT the fiscal or calendar year, and is submitted annually with the May-August Narrative Report.

(1) **Area or Unit:** A geographical unit which, because of size, terrain characteristics, habitat type and current or anticipated management practices, may be considered an entity apart from other areas in the refuge census pattern. The combined estimated acreages of all units should equal the total refuge area. A detailed map and accompanying verbal description of the habitat types of each unit should be forwarded with the initial report for each refuge, and thereafter need only be submitted to report changes in unit boundaries or their descriptions.

(2) **Habitat:** Crops include all cultivated croplands such as cereals and green forage, planted food patches and agricultural row crops; upland is all uncultivated terrain lying above the plant communities requiring seasonal submergence or a completely saturated soil condition a part of each year, and includes lands whose temporary flooding facilitates use of non-aquatic type foods; marsh extends from the upland community to, but not including, the water type and consists of the relatively stable marginal or shallow-growing emergent vegetation type, including wet meadow and deep marsh; and in the water category are all other water areas inundated most or all of the growing season and extending from the deeper edge of the marsh zone to strictly open-water, embracing such habitat as shallow playa lakes, deep lakes and reservoirs, true shrub and tree swamps, open flowing water and maritime bays, sounds and estuaries. Acreage estimates for all four types should be computed and kept as accurate as possible through reference to available maps supplemented by periodic field observations. The sum of these estimates should equal the area of the entire unit.

(3) **Use-days:** Use-days is computed by multiplying weekly waterfowl population figures by seven, and should agree with information reported on Form NR-1.

(4) **Breeding Population:** An estimate of the total breeding population of each category of birds for each area or unit.

(5) **Production:** Estimated total number of young raised to flight age.

Interior Duplicating Section, Washington, D. C. 27580

3-1750
Form NR-1
(Rev. March 1953)

WATERFOWL

REFUGE RAVALLI MONTHS OF September TO December, 19 70

(1) Species	(2) Weeks of reporting period									
	9/6-12	9/13-19	9/20-26	9/27-10/3	10/4-10	10/11-17	10/18-24	10/25-31	11/1-7	11/8-14
	1	2	3	4	5	6	7	8	9	10
Swans:										
Whistling				1	1			1	1	1
Trumpeter										
Geese:										
Canada	1	50	45	45	60	100	160	160	170	210
Cackling										
Brant										
White-fronted										
Snow										
Blue										
~~Other~~ Ross'										1
Ducks: TOTALS	1	50	45	45	60	100	160	160	170	211
Mallard	520	650	770	750	950	1100	1285	1450	1680	1450
Black										
Gadwall	20	20	15	25	50	130	145	145	155	95
Baldpate	250	650	1035	1050	1100	1350	2095	1800	645	590
Pintail	150	150	130	130	180	180	180	150	85	190
Green-winged teal	80	80	80	80	250	350	365	275	170	215
Blue-winged teal	80	80	60	60	30	15	10			
Cinnamon teal	80	70	60	60	30	15	10			
Shoveler	25	25	25	25	45	45	10	10		5
Wood	105	105	85	100	50	35		5	5	
Redhead	30	10	10	10	15	5	5	5	5	5
Ring-necked	40	50	60	60	55	40	15	10	10	10
Canvasback	1	1	1	1	25	10				5
Scaup	20	20	15	25	325	40	15	15	5	10
Goldeneye									10	10
Bufflehead			5	5	50	25	10	10		
Ruddy	100	80	45	45	1850	190	15	15	15	15
~~Other~~ TOTALS	1,501	1,991	2,396	2,426	5,005	3,530	4,160	3,890	2,785	2,600
Hooded merganser	50	45	30	30	100	60	30	20	20	50
Common merganser	15	15	15	15						
R.B. "	10	10	10	10						
Coot:	800	1100	1520	1400	1850	2500	3150	1700	520	330

3 -1750a
Cont. NR-1
(Rev. March 1953)

WATERFOWL
(Continuation Sheet)

REFUGE RAVALLI MONTHS OF September TO December, 19 70

(1) Species	(2) Weeks of reporting period: 11/15-21 (11)	11/22-28 (12)	11/29-12/5 (13)	12/6-12 (14)	12/13-19 (15)	12/20-26 (16)	12/27-1/2 (17)	(18)	(3) Estimated waterfowl days use	(4) Production: Broods seen	Estimated total
Swans:											
Whistling	1	1							35		
Trumpeter											
Geese:											
Canada	190	305	355	250	185	220	195		18,907		
Cackling											
Brant											
White-fronted											
Snow											
Blue											
~~Other~~ Ross'	1								14		
Ducks: TOTALS	191	305	355	250	185	220	195		18,921		
Mallard	2380	5520	7090	7100	5040	4900	4620		330,785		
Black											
Gadwall	40	25	55	40	45	45	45		7,665		
Baldpate	370	155	115	55	75	60	50		80,115		
Pintail	50	100	80	80	75	70	60		14,280		
Green-winged teal	190	135	170	70	80	70	65		19,075		
Blue-winged teal									2,345		
Cinnamon teal									2,275		
Shoveler	5		5	5					1,610		
Wood									3,430		
Redhead									700		
Ring-necked	10	10							2,590		
Canvasback	5								343		
Scaup	15		5	5	5				3,640		
Goldeneye	5	20	10	20	20	20	10		875		
Bufflehead	5	5	5						840		
Ruddy	10	5	5	5	1				16,772		
~~Other~~ TOTALS	3085	5,975	7,540	7,380	5,341	5,165	4,850		487,340		
Hooded merganser	40	50	20	20	15	15	15		4,270		
Common merganser	5	15							560		
R.B. "									280		
Coot:	200	40	30	30	15	15	10		106,470		

(over)

	(5) Total Days Use	(6) Peak Number	(7) Total Production
Swans	35	1	--
Geese	18,921	355	--
Ducks*	487,340	7,540	--
Coots	106,470	3,150	--

*Excludes mergansers

SUMMARY

Principal feeding areas Pools 2, 5, 6 and 10 prior to freezing. After icing & hunting opening pools 8 and 10 received heavy use, with feeding on grain fields.

Principal nesting areas --

Howard A. Lipke

Reported by Howard A. Lipke, Refuge Manager

INSTRUCTIONS (See Secs. 7531 through 7534, Wildlife Refuges Field Manual)

(1) Species: In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and national significance.

(2) Weeks of Reporting Period: Estimated average refuge populations.

(3) Estimated Waterfowl Days Use: Average weekly populations x number of days present for each species.

(4) Production: Estimated number of young produced based on observations and actual counts on representative breeding areas. Brood counts should be made on two or more areas aggregating 10% of the breeding habitat. Estimates having no basis in fact should be omitted.

(5) Total Days Use: A summary of data recorded under (3).

(6) Peak Number: Maximum number of waterfowl present on refuge during any census of reporting period.

(7) Total Production: A summary of data recorded under (4).

Interior Duplicating Section, Washington, D. C.
1953

3-1751
Form NR-1A
(Nov. 1945)

MIGRATORY BIRDS
(other than waterfowl)

Refuge Ravalli Months of September to December 1970

(1) Species	(2) First Seen		(3) Peak Numbers		(4) Last Seen		(5) Production			(6) Total
Common Name	Number	Date	Number	Date	Number	Date	Number Colonies	Total # Nests	Total Young	Estimated Number
I. Water and Marsh Birds:										
Great blue heron	From last period		25-30	Early Sept.	5-10	Still present				
Horned grebe (&/or eared)	" "	"	75-100	Early Oct.						
Pied billed grebe	From last period		50-75	Sept.	1-3	Still present				
Western grebe	15	10/9	15-20	Mid Oct.	1	10/20				
Sandhill crane	1	10/11-12	(Single yg. bird just east of refuge.)							
II. Shorebirds, Gulls and Terns:										
Killdeer	From last period		Many	Sept.	3	12/12				
Wilson's snipe	" "	"	200-250	Late Sept.	1	12/17	(98 on Pool 8 - 9/24)			
Greater yellowlegs	" "	"	Few	Sept.						
Sora rail	" "	"	Several	"						
Virginia rail	1	12/18	Few	Dec.	Few still present					
Sandpipers	From last period									
California gull	1	9/24	2	10/9						

(over)

(1)	(2)		(3)		(4)		(5)	(6)
III. Doves and Pigeons:								
Mourning dove	From last period		Many - Early Sept.		8	11/26		
White-winged dove								
IV. Predaceous Birds:								
Golden eagle, Bald	1	11/14	2	12/17	1-2	Late Dec.		
Duck hawk Pygmy owl	1	12/10	1	12/10	Few	" "		
Horned owl	From last period		15-20	resident	Still present			
Magpie	" " "		150-200	Oct.	30-50 present			
Raven	Several	9/24	Several	Late Nov.	Periodic appearances			
Crow	From last period		Periodic	use through period.				
Marsh hawk	From last period		6+	Late Nov.	1-3 still present			
Red-tailed hawk	" " "		Several	Sept.	2-4 " "			
Sparrow hawk	" " "		Many	Sept.				
Cooper's hawk	2	12/12	Few	Late Dec.	2	12/12		
Harlan's hawk	1	12/11	1 or 2	Late Dec.	1	12/18		
Osprey	From last period		1-3			Early Sept.		
Turkey vulture	3	9/4	3	Early Sept.	3	9/8		
Short-eared owl	From last period		6+	Mid-Nov. on	Still present			

Reported by Howard A. Lipke Howard A. Lipke

INSTRUCTIONS

(1) Species: Use the correct names as found in the A.O.U. Checklist, 1931 Edition, and list group in A.O.U. order. Avoid general terms as "seagull", "tern", etc. In addition to the birds listed on form, other species occurring on refuge during the reporting period should be added in appropriate spaces. Special attention should be given to those species of local and National significance. Groups: I. Water and Marsh Birds (Gaviiformes to Ciconiiformes and Gruiiformes)
II. Shorebirds, Gulls and Terns (Charadriiformes)
III. Doves and Pigeons (Columbiformes)
IV. Predaceous Birds (Falconiformes, Strigiformes and predaceous Passeriformes)

(2) First Seen: The first refuge record for the species for the season concerned.

(3) Peak Numbers: The greatest number of the species present in a limited interval of time.

(4) Last Seen: The last refuge record for the species during the season concerned.

(5) Production: Estimated number of young produced based on observations and actual counts.

(6) Total: Estimated total number of the species using the refuge during the period concerned.

INTERIOR—PORTLAND, OREGON

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURVEY

Refuge Ravalli

Year 1970

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
10/10-16	125	442	Mallard 100, Teal G.W. 31, Shoveler 19, Widgeon 19, Coots 14, Pintail 12, Gadwall 11, Ruddy 10, Teal B.W. 10, Ring-necked 9, Scaup 8, Unknown 8, Canvasback 6	257	39	296		
10/17-23	64	196	Mallard 23, G.W. Teal 8	52	13	65		
10/24-30	67	152	Mallard 18, Pintail 4, Ring-necked 4	41	17	58		
10/31-11/6	50	113	Mallard 24, Gadwall 5	40	12	52		
11/7-13	89	222	Mallard 16, Pintail 6	33	12	45		
11/14-20	55	149	Mallard 45, Canada geese 2	54	14	68		
11/21-27	107	330	Mallard 163, Pintail 6, Widgeon 6	189	25	214		
11/28-12/4	98	283	Mallard 92, Canada geese 5	108	12	120		
12/5-11	55	148	Mallard 56	60	9	69		
12/12-18	48	170	Mallard 69	69	2	71		
12/19-25	60	180	Mallard 68	71	1	72		
12/26-1/1	52	148	Mallard 35	39	1	40		
1/2-8 1/9-10	59	149	Mallard 43	64	2	66		
TOTALS	929	2682		1077	159 (15.2% minimum-duck only)	1236	1810	2475 (includes 20% crippling loss)

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1750c
Form NR-1C
(Sept. 1960)

WATERFOWL HUNTER KILL SURVE

Refuge Ravalli

Year 19Ø70

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est. No. of Hunters	(9) Est. Total Kill
			Breakdown for 1076 ducks:					
			%					
			Mallard 757 70.4					
		52	G.W. Teal)					
		15	B.W. Teal) 67 6.2					
			Widgeon 48 4.5					
			Pintail 41 3.8					
			Shoveller 29					
			Gadwall 28					
			Ring-neck 16					
			Scaup 16					
			Ruddy 15					
			Canvasback 9					
			Wood duck 2					
			Redhead 1					
			Unknown 47					
			Other:					
			Canada geese 9					
			*Snow geese 4					
			Coot 18					
			*Ross' likely					

(over)

INSTRUCTIONS

(1) The first week of hunting begins with opening day and ends at the close of hunting 6 days later. Successive weeks follow the same pattern.

(2) The goal is to survey a minimum of 25 percent of refuge hunters each week and to record data only from those who have completed their day's hunting. This information should be collected during each day of the week and in each area hunted in relative proportion to the hunter effort expended. When the 25 percent goal cannot be achieved, particular care should be taken to collect representative data.

(3) Record the total number of hours the hunters spent hunting on the refuge.

(4) List waterfowl species in decreasing order of numbers bagged. Sample entry: Mallard (61), Pintail (36), Redhead (16), Gadwall (11), Widgeon (6), Coot (4), Canada Goose (3), Green-winged Teal (1).

(5) Record total numbers of waterfowl bagged.

(6) Record total numbers of waterfowl reported knocked down but not recovered.

(7) Total of Columns 5 and 6.

(8) Estimate the total number of hunters who hunted on the refuge during the week, including hunters checked (Column 2).

(9) Kill sample projected to 100 percent. Column 9 = $\frac{\text{Column 8}}{\text{Column 2}}$ x Column 7.

3-1752
Form NR-2
(April 1946)

UPLAND GAME BIRDS

1613

Refuge Ravalli Months of September to December, 19 70

(1) * Species	(2) Density		(3) Young Produced		(4) Sex Ratio	(5) Removals			(6) Total	(7) Remarks
Common Name	Cover types, total acreage of habitat	Acres per Bird	Number broods obs'v'd.	Estimated Total	Percentage	Hunting	For Re-stocking	For Research	Estimated number using Refuge	Pertinent information not specifically requested. List introductions here.
Ring-necked pheasant	Brush, grass and agriculture-1000 A				1M/4F	15			D,100-120	State release of 50 hens supplemented wild population. Birds well distributed with noticeable good use made of south tract 27. Hunters had difficulty locating birds in hunting area.
Hungarian (Gray) partridge	Grass & agriculture 600 acres								D, 5-10	First 1970 observations made. Two sightings were made in west tract 25--flock of 7 on 11/14, pair on 11/29. Refuge use seasonal.
Ruffed grouse	Brush & timber of riverbottom-- 300 A. Principle range in tract 27.								D, 15-20	No new observations during period but remnant population maintaining itself in tract 27.

INSTRUCTIONS

Form NR-2 - UPLAND GAME BIRDS.*

(1) SPECIES: Use correct common name.

(2) DENSITY: Applies particularly to those species considered in removal programs (public hunts, etc.). Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge; once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated number of young produced, based upon observations and actual counts in representative breeding habitat.

(4) SEX RATIO: This column applies primarily to wild turkey, pheasants, etc. Include data on other species if available.

(5) REMOVALS: Indicate total number in each category removed during the report period.

(6) TOTAL: Estimated total number using the refuge during the report period. This may include resident birds plus those migrating into the refuge during certain seasons.

(7) REMARKS: Indicate method used to determine population and area covered in survey. Also include other pertinent information not specifically requested.

* Only columns applicable to the period covered should be used.

3-1753
Form NR-3
(June 1945)

BIG GAME

Refuge Ravalli Calendar Year 1970

(1) Species	(2) Density	(3) Young Produced	(4) Removals				(5) Losses			(6) Introductions		(7) Estimated Total Refuge Population		(8) Sex Ratio
Common Name	Cover types, total Acreage of Habitat	Number	Hunting	For Re-stocking	Sold	For Research	Predation	Disease	Winter Loss	Number	Source	At period of Greatest use	As of Dec. 31	
White-tailed deer	Brush, timber, grass & agriculture (1700 acres)	10					1 road kill					35	25	1M/2F

Remarks: Four sets of twin fawns.
No known kills were reported for the approximately 50 archery deer hunter visits recorded. Some harvest of refuge herd probably occurs in gun zone bordering NE boundary of the refuge.
Single day observation--20 different deer, 3/28/70.

Reported by Howard A. Lipke

INSTRUCTIONS

Form NR-3 - BIG GAME

(1) SPECIES: Use correct common name; i.e., Mule deer, black-tailed deer, white-tailed deer. It is unnecessary to indicate sub-species such as northern or Louisiana white-tailed deer.

(2) DENSITY: Detailed data may be omitted for species occurring in limited numbers. Density to be expressed in acres per animal by cover types. This information is to be prefaced by a statement from the refuge manager as to the number of acres in each cover type found on the refuge: once submitted, this information need not be repeated except as significant changes occur in the area of cover types. Cover types should be detailed enough to furnish the desired information but not so much as to obscure the general picture. Examples: spruce swamp, upland hardwoods, reverting agriculture land, bottomland hardwoods, short grass prairie, etc. Standard type symbols listed in Wildlife Management Series No. 7 should be used where possible. Figures submitted should be based on actual observations and counts on representative sample areas. Survey method used and size of sample area or areas should be indicated under Remarks.

(3) YOUNG PRODUCED: Estimated total number of young produced on refuge.

(4) REMOVALS: Indicate total number in each category removed during the year.

(5) LOSSES: On the basis of known records or reliable estimates indicate total losses in each category during the year.

(6) INTRODUCTIONS: Indicate the number and refuge or agency from which stock was secured.

(7) TOTAL REFUGE POPULATION: Give the estimated population of <u>each species</u> on the refuge at period of its greatest abundance and also as of Dec. 31.

(8) SEX RATIO: Indicate the percentage of males and females of each species as determined from field observations or through removals.

3-1755
Form NR-5
60701

DISEASE

Refuge Ravalli Year 19 70

Botulism

Period of outbreak N O N E

Period of heaviest losses

Losses:

	Actual Count	Estimated
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl		
(b) Shorebirds		
(c) Other		

Areas affected (location and approximate acreage)

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.

Condition of vegetation and invertebrate life

Remarks

Lead Poisoning or other Disease

Kind of disease N O N E

Species affected

Number Affected Species	Actual Count	Estimated

Number Recovered

Number lost

Source of infection

Water conditions

Food conditions

Remarks

3-1757
Form NR-7
(Rev. June 1960)

(1)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS

Refuge Ravalli Year 19 70

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs) Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Plantings (Marsh - Aquatic - Upland) Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival	Cause of Loss
Bulrush	75 rootstocks	C	7/9-10	Refuge	$40	75	Pools, 2,3,5	1/A.	75 A.	75 stocks	7/9-10	Unknown(1	--
Millett, Japanese	100 lbs	R	1970	Calif.	$28	100#	Pool 2A & Tr. 13 pond.	20#/A.	5 A.	100#	6/8 & - 11	5% produce seed	Horses, poor seed bed
Timothy, Ladino & Wh. Dutch clovers.		R	1969-70	Mont.		See NR-8A	Tract 27	10#/A.	.5 A.	5#	11/9	Unknown(2	--
PLUS: Nordan crested & intermediate wheatgrasses.	200#	R	1970	Mont.	$83	See NR-8A	Refuge-dikes, waste areas, islands.	20#/A (mix)	8 A.	160#	Oct.-Nov.	Unknown(3	--

(1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:
Marsh and aquatic 80
Hedgerows, cover patches 8
Food strips, food patches
Forest plantings .5

Remarks: (1 Survival of bulrush transplants to be determined after 1971 growing season.
(2 Fall seeded--survival to be determined in 1971. (Browse/cover)
(3 Fall seeded--survival to be determined in 1971. (Cover/erosion contro
Plantings of Russian olive, Honeysuckle & Caragana in 1968 show 75-80% survival. Vigor maintained by cultivation and watering.

INTERIOR--PORTLAND, OREGON

3-1758
Form NR-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge Ravalli County Ravalli State Montana

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Waterfowl Browsing Crops Type and Kind	Total Acreage
			Harvested		Unharvested				
	Acres	Bu./Tons	Acres	Bu./Tons	Acres	Bu./Tons			
Barley	72	4,510 bu.	1.5	90 bu.	32.5	2,050 bu.	106	Fall planted winter wheat on fallow acres (browse in fall & spring, but will produce grain in 1971).	65
Wheat (Gaines winter)	42	3,360 bu.	1	60 bu.	20	1,600 bu.	63		
Corn (Hybrid yellow)					1	50 bu.	1	Gaines winter wheat	2
Totals	114	7,870 bu.	2.5	150 bu.	53.5	3,700 bu.	170	Ladino clover/ timothy/white dutch clover.	1
								Fallow Ag. Land	87

No. of Permittees: Agricultural Operations 2 Haying Operations 1 Grazing Operations 4

1 apiary - 60 hives @.25 -- $15.00

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	GRAZING	Number Animals	AUM'S	Cash Revenue	ACREAGE
Alfalfa	104.32	37	$625.92	1. Cattle	75*	370.67	$1,112.01	520
				2. Other** horses-mules	26	100	181.50	180
				1. Total Refuge Acreage Under Cultivation				296
Hay - Wild				2. Acreage Cultivated as Service Operation				3

*Does not include calves.
**Includes up to 14 head of horses & mules owned by Forest Service--free use permit (intermittent use).

DIRECTIONS FOR PREPARING FORM NR-8
CULTIVATED CROPS - HAYING - GRAZING

Report Form NR-8 should be prepared on a calendar-year basis for all crops which were planted during the calendar year and for haying and grazing operations carried on during the same period.

Separate reports shall be furnished for Refuge lands in each county when a refuge is located in more than one county or State.

Cultivated Crops Grown - List all crops planted, grown and harvested on the refuge during the reporting period regardless of purpose. Crops in kind which have been planted by more than one permittee or this Service shall be combined for reporting purposes.

Permittee's Share - Only the number of acres utilized by the permittee for his own benefit should be shown under the Acres column, and only the number of bushels of farm crops harvested by the permittee for himself should be shown under the Bushels Harvested column. Report all crops harvested in bushels or fractions thereof except such crops as silage, watermelons, cotton, tobacco, and hay, which should be reported in tons or fractions thereof.

Government's Share or Return - Harvested - Show the acreage and number of bushels harvested for the Government of crops produced by permittees or refuge personnel. Unharvested - Show the exact acreage and the estimated number of bushels of grain available for wildlife. If grazing is made available to waterfowl through the planting of grain, cover, green manure, grazing or hay crops, estimate the tonnage of green food produced or utilized and report under Bushels Unharvested column.

Total Acreage Planted - Report all acreage planted, including crop failures.

Green Manure, Cover and Waterfowl Grazing Crops - Specify the acreage, kind and purpose of the crop. These crops and the acreage may be duplicated under cultivated crops if planted during the year, or a duplication may occur under hay if the crop results from a perennial planting.

Hay - Improved - List separately the kinds of improved hay grown. Annual plantings should also be reported under Cultivated Crops, and perennial hay should be listed in the same manner at time of planting.

Total Refuge Acreage Under Cultivation - Report total land area devoted to agricultural purposes during the year.

INT.-DUP. SEC., WASH., D.C. 91767

3-1570
NR-8a

REFUGE GRAIN REPORT*

Refuge Ravalli Months of January through December, 1970

(1) Variety*	(2) On Hand Beginning of Period	(3) Received During Period	(4) Total	(5) Grain Disposed of				(6) On Hand End of Period	(7) Proposed or Suitable Use*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Surplus
Barley	690	90	780			)		-	-	-	-
Wheat, winter	180	60	240			) 620	620	500		500	
Corn (Hybrid yellow)		.5	.5		.25		.25	.25 (13#)	.25		
Japanese Millet		3	3		3		3	0			
Timothy	31		31		5		5	26	26		
White Dutch clover	8		8		3		3	5	5		
Ladino clover		.33	.33		.05		.05	.28 (17#)	.28		
Alsike clover		.33	.33				0	.33 (20#)	.33		
Crested wheatgrass (Nordan)		7	7		3		3	4 (90#)	4		
Intermediate wht.gr.		2	2		.5		.5	1.5(40#)	1.5		

(8) Indicate shipping or collection points Northern Pacific R.R. depot, Stevensville

(9) Grain is stored at Headquarters granaries--work center and Q-2 area.

(10) Remarks Barley/wheat used for banding and emergency winter feeding. *This form also serves as refuge inventory for other seed.

*See instructions on back.

NR-8a

REFUGE GRAIN REPORT

This report should cover all grain on hand, received, or disposed of, during the period covered by this narrative report.

Report all grain in bushels. For the purpose of this report the following approximate weights of grain shall be considered equivalent to a bushel: Corn (shelled)—55 lb., corn (ear)—70 lb., wheat—60 lb., barley—50 lb., rye—55 lb., oats—30 lb., soy beans—60 lb., millet—50 lb., cowpeas—60 lb., and mixed—50 lb. In computing volume of granaries, multiply the cubic contents (cu. ft.) by 0.8 bushels.

(1) List each type of grain separately and specifically, as flint corn, yellow dent corn, square deal hybrid corn, garnet wheat, red May wheat, durum wheat, spring wheat, proso millet, combine milo, new era cowpeas, mikado soy beans, etc. Mere listing as corn, wheat, and soybeans will not suffice, as specific details are necessary in considering transfer of seed supplies to other refuges. Include only domestic grains; aquatic and other seeds will be listed on NR–9.

(3) Report all grain received during period from all sources, such as transfer, share cropping, or harvest from food patches.

(4) A total of columns 2 and 3.

(6) Column 4 less column 5.

(7) This is a proposed break-down by varieties of grain listed in column 6. Indicate if grain is suitable for seeding new crops.

(8) Nearest railroad station for shipping and receiving.

(9) Where stored on refuge: "Headquarters granary," etc.

(10) Indicate here the source of grain shipped in, destination of grain transferred, data on condition of grain, unusual uses proposed.

.-DUP. SEC., WASH., D.C. 59323

3-1761
Form NR-11
(2/46)

TIMBER REMOVAL

Refuge Ravalli Year 1970

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species Cut
NONE*								

Total acreage cut over.....

Total income.....

No. of units removed B. F.....

Cords.....

Ties.....

.....

Method of slash disposal.....

*40,000 board feet of Ponderosa Pine timber scaled in tract 27 in November. Salvage cut in basin of Pool 12 to be reported in 1971.

INT.-DUP. SEC., WASH., D.C. 36103

3-1979 (NR-12)
(9/63)

Bureau of Sport Fisheries and Wildlife

Refuge Ravalli

ANNUAL REPORT OF PESTICIDE APPLICATION

Proposal Number

Reporting Year 1970

INSTRUCTIONS: Wildlife Refuges Manual, secs. 3252d, 3394b and 3395.

Date(s) of Application	List of Target Pest(s)	Location of Area Treated	Total Acres Treated	Chemical(s) Used	Total Amount of Chemical Applied	Application Rate	Carrier and Rate	Method of Application
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) May 18-20	Broadleaf annuals Mustard Canada thistle Scotch "	Agricultural lands fields A21-1 thru 21-8, All land 2, and A 19-1.	170	2,4-D, PGBEE	43 lbs. ae (11 gal.@4#ae)	.25 lbs./A	Water 10 gal/A.	Tractor/ broadjet
(2) June 18-19	Thistles Canada Scotch Knapweed	Dikes & roads, disturbed plots & waste ag. land (10 sites)	45	2,4-D, DMS	48 lbs. ae (12 gal.@4#ae)	1.06 lbs./A.	Water 10 gal/A.	County spray-truck, hand nozzle & boom.
(3) June 11-12	"	Tract 19 pasture-grazing unit G-19	56	2,4-D, DMS	56 lbs. ae (14 gal.@4#ae)	1 lb./A.	"	"

10. Summary of results (continue on reverse side, if necessary)

(1) Because of the spread in dates of application some variation occurred in spraying conditions. Control on prime target species (mustard) estimated at 80-90%, and competition from more hardy species (thistle) was reduced. Effects varied with units with control least successful on later sprayed units, particularly A 19-1.

(2) Estimate 65-70% kill with most of remaining thistle plants weakened (no seed production). Spray areas which have received repeated treatment converting to grass cover. South refuge dike infestations showed best results.

(3) Grassland pasture sprayed at expense of Forest Service. Control of weeds on unit 80% effective due to repeated spraying but kill on knapweed less than that of thistle. Last year of spraying, but competition of grasses on majority of unit should hold down noxious weeds in the future.

INTERIOR--PORTLAND, OREGON